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VOLUME XLV
No. 26

December 28, 1918

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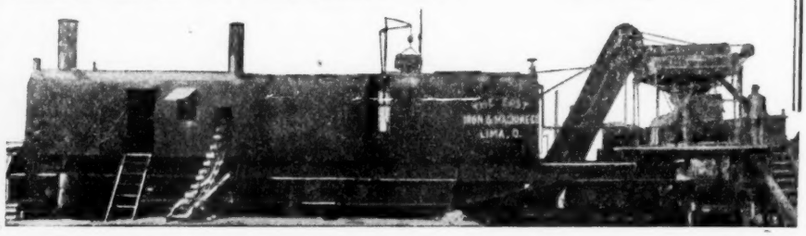

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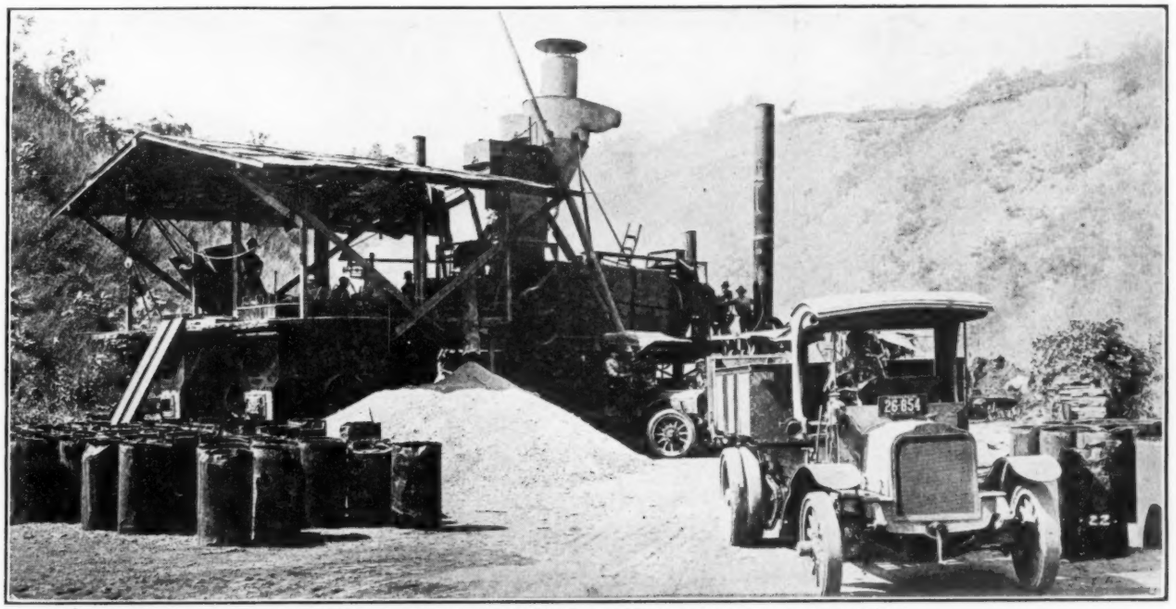

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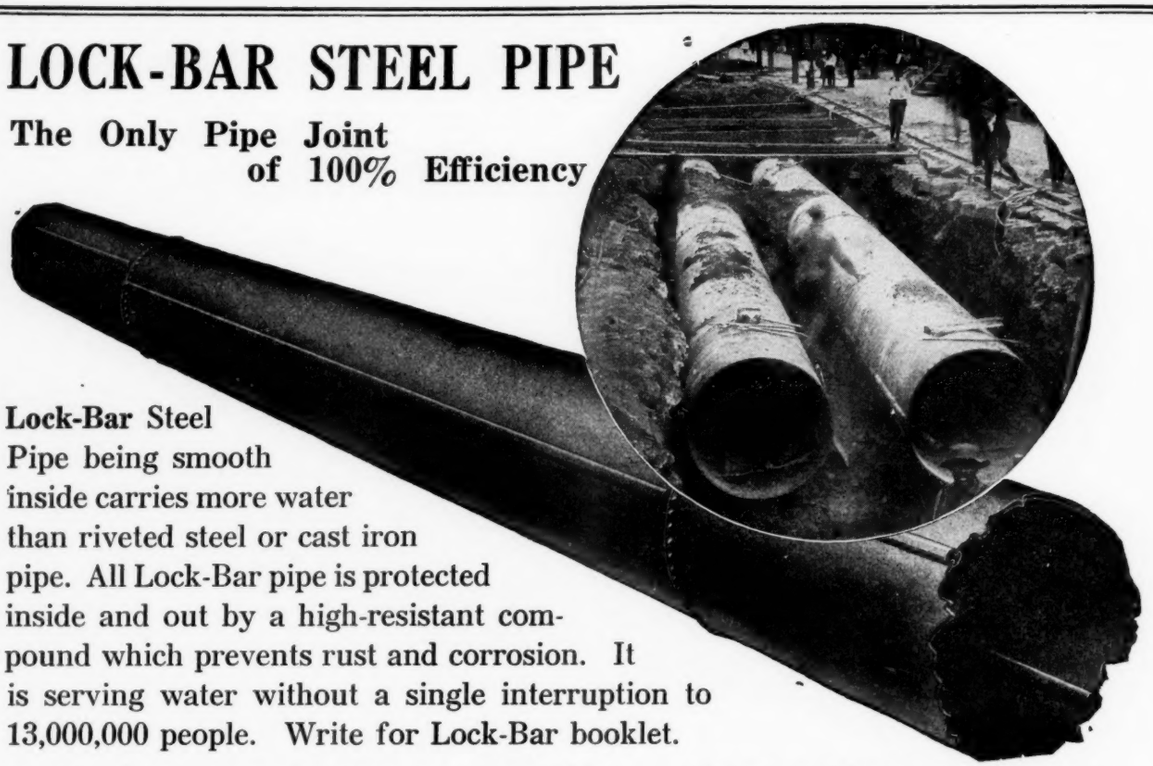

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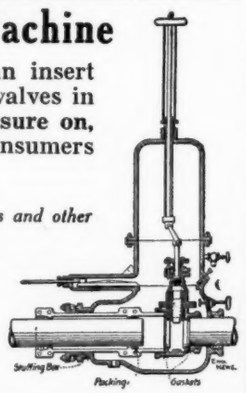

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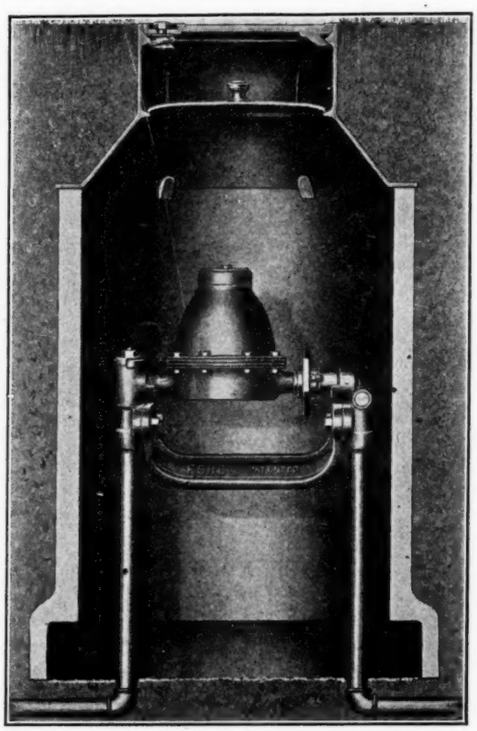

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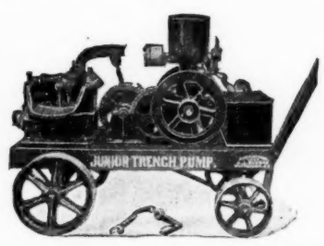

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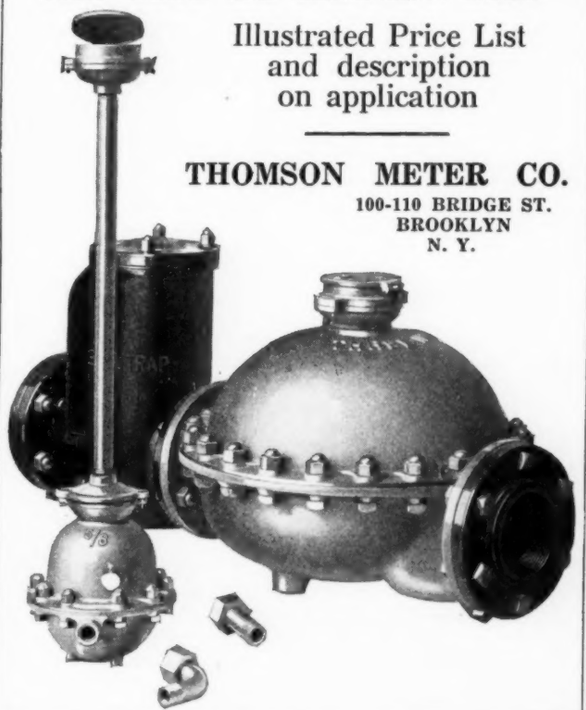

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A brief description of the article, name of the author in case of contributed articles, length, number of illustrations, name of periodical in which it appears, and the price of the periodical are given.

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Municipal Index

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Municipal Journal, 243 West 39th St., New York, N. Y.

Municipal Journal

Volume XLV. NEW YORK, DECEMBER 28, 1918 No. 26

SOME SEWER CONSTRUCTION DETAILS

Small Pumping Stations—Laying a Sewer Above Street Grade—Excavating and Laying Sewer in Deep Trench in Sand and Water.

About twenty-five years ago the city of Plainfield, N. J., constructed a sewer system and a sewage disposal plant which attracted considerable attention at that time. Later, the plant was enlarged and modified to include two of the first septic tanks built in this country. As the city grew, this plant became inadequate, the population moved nearer to the plant so that its effect upon value of property in the neighborhood became more apparent, and it became evident a few years ago that either the capacity of the existing plant must be increased or a new plant built on another location. In the meantime the boroughs of North Plainfield (which is separated from Plainfield by Green Brook) and Dunellen were increasing in size and were beginning to feel the necessity for sewerage. The discharge of raw sewage into Green Brook, the only outlet for all three of these communities, would not be permitted by the State Board of Health, nor could it be defended, and sewering the two boroughs, therefore, involved a treating of the sewage.

Under these conditions it was natural that the cooperation of the three communities in a joint disposal plant was advocated, and the matter was under consideration for two or three years. The location for the disposal plant recommended by the engineers was in still another town, and it was necessary to obtain legislative permission to use this location. Finally, however, all difficulties were overcome and the city and two boroughs agreed upon joint action, in the name of the "Joint Meeting of the Inhabitants of the City of Plainfield, the Borough of North Plainfield and the Borough of Dunellen," generally referred to as the "Joint Meeting." George W. Fuller of New York had been the consulting engineer for the boroughs during the preliminary work, and was employed by them to prepare final plans and superintendent construction.

The project necessitated, in connection with a joint disposal plant, a trunk sewer leading to it. At its upper end this trunk sewer receives the sewage from Plain-

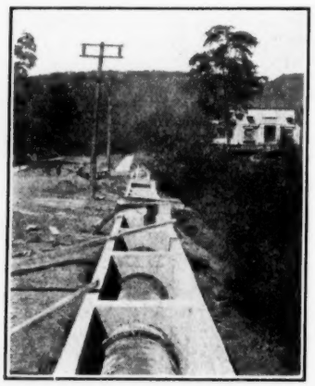
VIEW OF SPRINKLING FILTER UNDER CONSTRUCTION.
In foreground, collecting drains; beyond these, distributing main in position. Resting temporarily on drains, are the distributing pipes, which were set on the concrete posts and connected up to risers from the distributing main.

field through a line brought from the existing disposal works of that city; the sewage of Dunellen, which is brought to the trunk sewer through a pumping main, and the sewage of North Plainfield which reaches it through a main collecting sewer. As neither North Plainfield nor Dunellen had, previous to this time, any sewers whatever within their limits, each of these boroughs built a system of collecting sewers draining to the pumping station in Dunellen and the main intercepting sewer in North Plainfield. All of this work was planned by the same engineer and constructed under his supervision.

PUMPING STATIONS.

Although the collecting systems in North Plainfield and Dunellen differ little, if any, in design from the best standard practice for this kind of work, there were some details of construction which are of considerable interest. The entire country is slightly rolling and part of it quite flat, and this made necessary some rather deep trenching and three sewage pumping stations, one in North Plainfield and two in Dunellen. The pumping station at Plainfield consists of a Pacific Flush Tank Company's ejector with a nominal capacity of 100 gallons per minute against a total head of 30 feet, including friction. Compressed air for this is furnished by two motor-driven Ingersoll-Rand air compressors designed for a working pressure of 50 pounds, the motors being 10 h.p. induction of the slip-ring type. The motors are started and stopped automatically by the variation of pressure in the air receiver.

The Dunellen collecting system as contracted for comprises 8-in. to 15-in. vitrified pipe sewers, 2,888 Y branches with 5-inch house connections, 1,600 feet of 6-inch cast iron force main and two sewage pumping stations. One of these, which handles the sewage from a small section only, consists of three Pacific Flush Tank Company's ejectors, each with a nominal capacity of 100 gallons per minute against a total head of 30 feet, with two Ingersoll-Rand air compressors and two 10 h.p. motors. Practically all of the sewage of the borough drains to the main pumping station, at which there are two centrifugal pumps (with space reserved for a third), each with a capacity of 500 gallons per minute against a total head, including friction, of 68 feet. These pumps are driven by vertical-shaft motors, each of 25 h.p. and fitted with an automatic starting switch which is operated by a float in the sewage well. The underground portion of the pumping station is divided into two wells by a concrete wall, one of which receives the sewage and the other, which remains dry, contains the pumps.



SEWER LAID IN BALUSTRADE
Coping not yet set.

SEWER LAID ABOVE STREET GRADE.

The contract for the North Plainfield collecting system provided for vitrified pipe sewers from 8 to 24 inches, including 3,490 Y branches, with 5-inch house connections laid to the curb.

There was also in this line 1,700 feet of 6-inch cast iron force main from the pumping station, which included a stream crossing made with 8-inch cast iron pipe as an inverted siphon. A unique feature was introduced at another part of this line, where 720 lineal feet of 24-inch cast iron pipe was laid across an arch bridge over a valley, its elevation being above that of the roadway level in order to keep it at hydraulic gradient. To accomplish this, a hollow concrete balustrade was constructed along one side of the bridge and the approaches to it, and the pipe was laid inside this balustrade. Each pipe was supported by cross-walls inside the balustrade. The balustrade consisted of two parallel walls, between which the pipe line was laid to grade, the supporting cross-walls (which also served to strengthen the structure) were built around the pipe, and the whole was then covered with slabs of concrete as a coping.

LAYING SEWER IN WET SAND.

The most interesting work in Dunellen was probably the constructing of the main collecting sewer, which was laid in a trench about 20 feet deep, to which considerable ground water found its way—so much, in fact, that four diaphragm pumps operated by "Domestic" gasoline engines were operated within a space of 50 feet to keep the water down sufficiently to permit the laying of the pipe. The soil is all sand and close-sheeting was necessary. In order to secure tight joints, these were made with Standard Pipe Sealing Compound obtained from the Standard Paint Company of Bound Brook, this being a bituminous material which is heated and poured like a lead joint. (A similar material called "Jointite" was used in other parts of the work.) An asbestos jointer was used and left in place for about five minutes for the compound to harden. In order to keep the joints dry, to avoid trouble with sand flowing into the pipe, etc., a line of rangers was nailed to the bottom of the sheeting in such position that the top of the ranger was two inches lower than the outside bottom of the sewer pipe, and under each pipe were placed three 2x8-inch planks crosswise of the trench resting upon the tops of the two rangers. The trench was excavated a few inches deeper than these boards, and, the pump suctions being placed a few feet apart in the section of the trench in which laying was being carried on (the trench being bulk-headed into sections), the water was easily kept below the joint. As there was considerable space between the pieces of plank on which the pipe rested, and as the backfilling was all sand, and the bottom of the trench was filled with water, it was believed that the backfilling would work thoroughly under the boards and that there would be no future settlement even when the planks rot out. This method of construction certainly seemed to avoid practically all of the difficulties so frequently found with laying sewers in wet sand trenches, except a certain amount of difficulty with sand getting into the suctions of the pumps.

WATER FILTRATION AT MINNEAPOLIS.

The Minneapolis water filtration plant consists of a 7.5-million-gallon sedimentation basin, four coagulation basins, sixteen filter beds, and a 45-million-gallon covered clear-water reservoir. The water is treated with sulphate of alumina, thoroughly mixed and coagulated and allowed to settle, after which it is filtered by rapid sand filters. After filtration it is treated with chlorine gas. It is planned to provide a plant for softening the water which will involve the construction of appliances for softening, filtration and semi-direct pumping of the water.

According to a recent statement, the wash water used for cleaning the filter plant amounted to 3.3 per cent of the total water filtered. Alum was used to the amount of 2.54 grains per gallon, this large amount being required for the removal of color. It is interesting to note that the average color of the river has been decreasing

steadily from year to year owing, it is believed, to the decrease in the logging industry along the Mississippi river above Minneapolis and also to the draining of swamp areas as more and more land is prepared for agricultural use. From a maximum color of 130 parts in 1914, the maximum decreased to 86 in 1915 and 84 in 1916. The average color of the filtered water was 18 parts per million in 1913, 17 in 1914, 14 in 1915, and 12 in 1916. The cost of operation per million gallons filtered was: Labor, $2.79; materials, $6.11; total, $8.90.

Some interesting figures on the effect of the use of filtered water upon the health of the community are reported. For thirteen years prior to the filtration of the city supply (which went into service in 1913), the average death rate from typhoid fever per 100,000 population was 31. Since the city began using filtered water, the rate has been reduced to an average of 9, the rate for 1916 having been 5 per 100,000.

The book value or cost of the filtration plant is given as $963,709. The total value of mains, pumping stations, reservoirs, etc., including the filtration plant, is given as $10,317,753. This is after deducting $259,000 for abandoned stations and the scrapping of old equipment, but no allowance has been made for depreciation.

ST. LOUIS WATER PURIFICATION PLANT

Amounts and Prices of Chemicals Used—Methods and Results of Operation—Cleaning Filter Sand—The Strainer System—Entrained Air—Effects of Chemicals on Apparatus—Itemized Cost of Operating Plant.

During the year 1917-1918 there were filtered by the water purification plant of St. Louis 39,373 million gallons of water. To this water were added 1,636 tons of sulphate of iron, or at the average rate of 0.58 grain per gallon; 15,608 tons of lime, or at the rate of 5.56 grains per gallon; 1,922 tons of sulphate of alumina, or an average of 0.68 grain per gallon; 76,352 pounds of chlorine, an average of 1.94 pounds per million gallons. The sulphate of iron and the lime were added before sedimentation, the aluminum sulphate after sedimentation but before filtration, and the chlorine after filtration.

Sulphate of iron, in the form of sugar sulphate, cost $12.50 per ton until July, when the the price was increased to $14. The liquid chlorine was supplied at a price of 13.375 cents per pound, delivered in 100-pound cylinders. The sulphate of alumina was purchased at a cost of $21 per ton until September 1, 1917, and at $23.50 after that date. Basic sulphate of alumina containing not less than 17 per cent of available water-soluble alumina was required. Lime was produced under a specification requiring 85 per cent CaO, with a bonus or penalty of 1½ per cent of the contract price for each per cent of CaO above or below that required. All lime was sampled as it came from the crusher after unloading, and analysed in the laboratory. Prior to this year the annual contracts had been made with lime companies, but this year the companies refused to make contracts for longer than three months. One company charged $7.50 a ton prior to January 1 and $8 per ton after that, and another company charged 8 cents more for each period.

The grit chamber removed 31 per cent of the total suspended matter in the river water, more than 50 per cent of which material was sufficiently fine to pass a 100-mesh sieve. This deposit, amounting to 144,230 cubic yards, was flushed back into the river. The grit chamber was cleaned on an average once a week, the periods between cleanings varying from four days to two weeks.

For the greater part of the year the lime was added to the raw water as it entered the mixing conduit, and the sulphate of iron as the water left this conduit. When the water was high in color and low in turbidity, however, the iron was added before the lime with good results; but if high color was accomplished by a turbidity of more than 200 or 300 parts per million, better results were obtained by adding the sulphate of iron as it left the conduit. With low color and low turbidity due to colloidal matter, the sulphate of iron was added at the mid-length of the conduit.

The milk of lime remaining in the slaking tanks at the end of a run was formerly drained into a sewer, but during the past year this practice was changed and it is now transferred to the tank to be put into service by means of a water-jet pump. It is estimated that by this practice there is a saving in a year of 125 tons of lime.

The milk of lime as pumped contained 38,600 parts per million of calcium-oxide, the temperature averaged 81°, the monthly averages being a maximum during July and a minimum during March, being 108° and 62° respectively for those two months.

The coagulants are precipitated as calcium carbonate, ferric hydroxide and aluminum hydroxide. The total amount of these coagulants that were precipitated last year was 27,584 tons. The suspended matter removed by precipitation totaled 311,247 tons, and the dissolved matter so removed totaled 14,992 tons. The total amount of precipitated matter removed from 39,317 million gallons was 356,089 tons. This is in addition to the 97,370 tons of solids removed by the grit chamber.

Of the total amount of material so removed, a little over 130,000 tons was cleaned out of the tanks by hand and teams. The remainder (excluding the sand removed by the grit chamber) was flushed out through the sewers by opening the mud gates about six inches for a half-hour period at varying intervals and as the basins were drained for cleaning. The cost per cubic yard of removing the mud from the sedimentation basins was 0.72 cent and from clear water basins was 31.3 cents. These costs are for labor and teams only and do not include anything for water used in cleaning or flushing and that drawn off.

The turbidity of the river water varied from a minimum of 8 in January to a maximum of 50,000 in June, the average for the year being 1,220. After settling, the turbidity was reduced to an average of 24, the minimum being 4 and maximum 110. As the water was applied to the filters it had a turbidity of 11. The filter effluent at all times had a turbidity of zero.

The color of the river water averaged 22, varying from 10 to 45, while the average of the settled water was 14, of that applied to the filter was 12, and of the filter effluent was 10.

Says August V. Graf, chief chemist of the Supply and Purifying Section, in his report: "With high stages in the Mississippi and Illinois rivers and a low stage in the Missouri, we encounter our worst condition for the treatment of the water. The high color of the Mississippi together with the colloidal matter in the Illinois made the water extremely hard to handle. The use of sulphate of iron as a coagulant at this time was accompanied by some difficulty. The coloring matter of the water combined

with the iron and instead of a diminution in color, the color was increased. The suspended matter being really colloidal and some of the iron hydroxide remaining in the colloidal condition, the turbidity of the water after passing through the six sedimentation basins was greater than that of the river.

"This highly colored and turbid water was much less amenable to treatment with sulphate of alumina. The amount of sulphate of alumina required to give the required flocculation of the suspended matter was four grains per gallon. With this large amount of sulphate, the water passing the filters was clear but still of high color, the iron content being eight to ten times as great as normally. No relief was experienced from this condition until the Missouri river run-off was increased and gave us a turbid water which offered enough suspended matter for the rapid subsidence of the floc of ferric hydroxide.

"The total reduction in hardness, due to removal of part of the dissolved bicarbonate of calcium and magnesium present in the river water, was 84 parts per million. For every part per million of lime added there was a reduction in hardness of 0.87 part per million. Fifty-five per cent of the calcium and 47 per cent of the magnesium present in the river water were removed by the added lime.

"This reduction in hardness of 84 parts per million means a saving in soap of 95 cents per 1,000 gallons of water used for washing purposes. This reduction in hardness also means the reduction of the scale-forming solids from 1.3 pounds per 1,000 gallons in the river water to 0.7 pound per 1,000 gallons in the water to mains."

The average number of bacteria on agar in the river water and in the water to the mains was less than for the previous year, the former averaging 7,030 and the latter 11. The per cent removed of the total number of 20° bacteria was 90.8, and that of 37° bacteria was 99.9. The number of B. coli per c.c. averaged 17.8 in the river water, 0.2732 in the settled water, .0493 in the filtered water, and .0119 as it reached the consumers. It was considered that the water delivered was safe at all times during the year.

OPERATION OF FILTERS.

Several features of the operation of the filtration plant will be of interest to those in charge of other plants and also to designers of plants. From the report of August G. Nolte, superintendent of the plant, we derive the following information:

The forty filters were continuously in service except for short periods when minor repairs were being made. The rate of filtration varied from 143.1 million gallons per acre per day to 31.1 million, averaging 85.2. The maximum run of a filter was 206.75 hours, filtering 22.63 million gallons; the minimum run was 7.67 hours, filtering 1.24 million gallons; the average run was 50.23 hours, filtering 5.66 million gallons.

CLEANING FILTER SAND.

During the year there were 8,964 washings of filters, using 614.38 million gallons of water, or 1.57 per cent of the water filtered.

During twelve months of operation ten of the filters showed an average increase of depth of sand of ¼-inch, three showed no change, and twenty-seven showed a loss of ¾-inch.

The rate of wash during the year has been kept fairly constant, about 15 gallons per square foot per minute. With this rate of wash, mud balls do not accumulate, but with a lower rate the increase in number and size is quite noticeable. Once every month each filter is washed at a rate of 17 gallons per square foot, at which time a ¼-inch screen is pulled through one section in each half of the filter unit. The number of mud balls caught on the screen are counted; if there is an increase over the previous month the rate of wash is increased until the mud balls are again normal. In this way a good check is kept on the condition of the sand bed.

THE STRAINER SYSTEM.

A considerable amount of sand was found on top of the strainer plates, varying from ¼ inch to 1 inch in depth. Some of the lateral channels were completely filled with sand. The depth of sand under the plates varied from 3 inches at the east and west ends of the filter to nothing toward the center.

Part of the effluent pipe was removed and an examination of the interior of the under-drains was made. Sand was found in the 10-inch pipe connecting the outlet castings in the filter bottom. Concrete and rubbish were found in the four 10-inch elbows in the under-drain system which reduced the area from 30 to 50 per cent. This material was removed by drilling 1½ inch holes in the under-drains and loosening the material with a chisel and flushing with a hose.

Two cracked center plates and about twelve broken U-bolts were found, and some of the end plates were not properly grouted, particularly the end of the plate near the wall, leaving sufficient room for sand to get by. A large number of holes in all of the plates were found stopped up with sand, and underneath all of the plates there was a soft greenish scale forming, which is now about 1/32 inch thick in places. This scale reduced the area of a large number of holes. An analysis of the scale gave the following results:

Loss on ignition	10.6 per cent
ZnO	38.7 per cent
SiO_2	2.9 per cent
CuO	41.0 per cent
Al_2O_3	3.0 per cent
Ca and Mg	trace
Pb SO_4	2.2 per cent

All of the sand in the lateral channels was flushed to the central channel with a hose and removed with scoops. The center plates were replaced and the end plates grouted where necessary. After cleaning all of the holes in the plates and replacing the gravel and sand, the filter was put in operation, when it was found that the loss of head in washing had been reduced from 16 feet to 7.8 by the overhauling.

On one occasion it was found that a stick could be shoved through the sand all the way to the strainer plate while washing, showing that the gravel there had disappeared. On examination several end strainer plates were found loose at this point, thus permitting the gravel to be washed out. The loose plates were fastened and re-grouted.

On draining down one of the filters preparatory to washing, a large hole was observed in the sand bed, caused, investigation revealed, by the breaking of a U-bolt in an end plate, permitting the plate to bend up slightly. Several cubic feet of sand were found in some of the lateral channels at and near this break, and some in the under-drain pipe. It is believed that U-bolts are broken by admitting the wash water too rapidly at the beginning of a wash. All broken bolts thus far found have been defective ones, half the section showing an old break. All breaks occurred at the bottom of the U. In going over the stock of U-bolts it was found that about 25 per cent could be broken very easily with the hands.

ENTRAINED AIR.

The total amount of air entrained during a single run

of each of eight filters was measured once during each month from July to January. The measurements were made as follows: The filter was drained to within a few inches of the top of the sand, the effluent valve was shut, and quick measurements were taken to compute the apparent amount of water required to fill the filter to the overflow of the lateral gutters. Wash water was then admitted very slowly until the water was about to overflow into the gutters, the amount so admitted being measured in the wash-water tank. During this interval all of the entrained air was supposed to be liberated. The difference between the amount of water actually admitted and that computed gave the volume of entrained air that had been liberated. (The water temperature was taken at each measurement.) Taking the averages of results of eight filters, the temperature of the water (in degrees centigrade) and the corresponding number of cubic feet of air per million gallons of water filtered per hour were as follows: 0.8°—6.87 cu. ft.; 7.6°—2.90 cu. ft.; 12.4°—1.06 cu. ft.; 21.5°—0.89 cu. ft.; 26.4°—0.51 cu. ft

EFFECTS OF CHEMICALS ON APPARATUS.

The aluminum sulphate solution as applied had a strength of 1 to 3 per cent. It was kept as weak as possible to prevent unnecessary corrosion of the metal parts with which it comes in contact.

The concrete dissolving boxes were thoroughly overhauled during the year. The concrete surface was chipped, resurfaced with sand and cement, painted with a heavy coat of pitch and then two coats of asphalt paint were applied. The outlet piping from the dissolving boxes and all elbows and tees placed horizontally were renewed.

The waterproofing on the bottom of the solution tanks had been worn off, but on the side walls it was still intact. The exposed concrete surface at the bottom was in fair shape, only the finish being raveled.

The agitator shafts in the chemical solution tanks are constantly exposed to the action of the sulphate solution. A new shaft was put in one tank, and it is probable that those in the remaining tanks will need replacing during the coming year.

All of the 3-inch gate valves (twelve in number) around the chemical solution pumps leaked badly. They were repaired by casting new gates and scraping the seat in the body of the old valve. No trouble had been experienced during the six months following.

All of the 3-inch bronze piping around the chemical pumps was taken apart during the year and the interior scraped and painted with asphalt. The scale in the pipe was very hard and about ⅛-inch thick. Aside from this scale, the interior of the pipe was in very good condition, the hard scale protecting the metal from corrosion.

In November a new set of impellers and labyrinth rings were put in each of the two chemical pumps, the old parts being corroded to such an extent that it was becoming impossible to pump enough solution to supply the demand.

The sulphate solution is pumped through two 4-inch lead lines to a receiving trough at the north end of the filter plant. The excess is returned to the pumps through a single 4-inch lead line. The west discharge line is connected up by 1¼-inch lead pipe to the influent pipe at each filter. Several times during the year these pipes had to be cleaned of the deposit that settles out from the sulphate solution.

The greater part of the soft deposit was flushed out, but there was a rather hard scale that forms in the pipe that had to be scraped out with a disc.

The bronze outlet casting in the orifice boxes of the automatic chemical meters and the conical plugs that regulate the area of the outlet had been corroded by the sulphate solution to such an extent that the automatic control did not properly change the amount of solution to be fed in proportion to the amount of water passing the 8-foot meters, and regulation frequently had to be made by hand. Mr. Nolte was expecting to replace these parts in a short time.

Analysis of Hard Scale.

Loss on ignition	SO_3	15.0 per cent
	H_2O	13.9 per cent
SiO_2		6.4 per cent
Fe_2O_3		57.9 per cent
Al_2O_3		6.4 per cent
PbO		0.3 per cent
Ca and Mg		trace

COST OF OPERATING PLANT.

The itemized cost of operating the Chain of Rocks filtration plant during the year 1917-1918 was as follows:

Chemical Laboratory.	
Labor	$10,966.25
Material and supplies	645.90
Miscellaneous repairs	1,034.31
Miscellaneous expenses	229.46
Total	$12,875.92
Coagulant House.	
Labor, operating	$ 8,162.87
Labor, unloading lime and iron	3,272.30
Maintenance	6,545.92
Repairs	820.39
Water	478.57
Light	650.54
Power	3,029.57
Miscellaneous repairs	715.57
Miscellaneous supplies	610.93
Miscellaneous expenses	27.56
Total	$24,314.22
Filter Plant.	
Labor, operating	$22,078.64
Labor, unloading chemicals	374.41
Maintenance	4,847.63
Repairs	2,103.90
Water	6,280.66
Light	1,858.42
Power	6,133.85
Coal	3,997.25
Miscellaneous repairs	1,511.39
Miscellaneous supplies	1,812.76
Miscellaneous expenses	98.00
Total	$51,096.91
Additions and extensions	$717.63
Settling Basins.	
Labor, cleaning	$2,240.12
Material, cleaning	241.22
Water, cleaning and flushing	3,839.46
Repairs	847.77
Total	$7,168.57
Additions and extensions	$1,647.46
Chemicals, etc., Used.	
Lime	$107,109.90
Sulphate of Iron	21,004.38
Sulphate of Alumina	42,788.85
Chlorine	10,212.09
Switching	6,171.75
Demurrage	60.00
Total	$187,346.99
Summary of Costs.	
Chemical Laboratory	$12,875.92
Coagulant House	24,314.22
Filter plant	51,096.91
Basins	7,168.57
Chemicals	187,346.99
Total	$282,802.61
Additions, etc.	$2,386.09
Purification cost per M. G. pumped	7.19
Purification cost per M. G. consumed	7.43

WATERWORKS OPERATION: MAINTENANCE OF RESERVOIRS.

Features of Maintenance of Small Reservoirs and of Large Impounding Reservoirs—Sodding and Other Treatment of Embankments.

So far as maintenance considerations are concerned, reservoirs may be divided into small basins constructed wholly or largely by artificial embankments, and large reservoirs formed by the construction of a dam of earth, masonry or steel thrown across a valley. In the former, the more common items of maintenance are the prevention of leakage through the embankments, protections of the embankments against wash and erosion by rain water, and the preservation of a neat appearance by the cutting of grass on the embankment, keeping up of walks along its top, maintenance of the fence around the basin and the preservation of the purity of the water.

The last named may involve prevention or repeated destruction of algae growth and occasionally other organic matters both animal and vegetable, and the exclusion or removal of leaves and other air-carried matters that may fall upon the surface. Where the reservoir receives water containing more or less suspended matter, which is likely to be the case wherever the supply is derived from streams or other surface bodies of water and is not purified, periodic removal of the sediment from the bottom of the reservoir will be necessary.

In some cases organic growths will develop on the sides and possibly even the bottom of the reservoir. Probably most of these will not be seriously objectionable while alive, but when they ultimately die the decomposition of them may cause objectionable odors and taste unless the water also contains fish and other animal organisms that, feeding upon this vegetable matter, will prevent its offensive decomposition.

In the case of large reservoirs formed by dams, the leakage that demands attention is generally confined to the dam itself; leakage through the soil that forms the bottom of the reservoir, if there should be such, is a matter so serious because of the enormous area involved that it should lead to radical changes and cannot well be handled by any maintenance methods. The maintaining of the dam will involve the problems occurring in the case of small embankment reservoirs. There will generally be, with these reservoirs, the additional problems of precaution against floods, minimizing the collection of sediment and floating materials washed into the reservoir by the stream that feeds it, and the removal of sediment at intervals in order to maintain the storage capacity; also the prevention of drainage into the reservoir of surface water from the immediately surrounding slopes, where this would carry with it any considerable amount of soil, leaves or other matters. The problem of keeping leaves and other organic matter from a large reservoir is frequently more difficult than in the case of the small reservoir. It is desirable that the land immediately surrounding the reservoir be under cultivation to prevent erosion, and there is the advantage in having it densely wooded that this very greatly reduces the blowing immediately across the water surface of winds that would greatly increase the evaporation from the reservoir. There are other advantages in maintaining trees on watersheds that will be referred to later.

In addition, since the basin occupied by the reservoir generally contains no artificial lining, and since the water in most cases rises and falls with the variations in rate of run-off from the watershed, there is a tendency during low water for grass and other vegetation to grow luxuriantly just above the water surface, which vegetable matter is submerged with the rising of the reservoir water and quickly decomposes.

When sudden floods bring down large quantities of fresh organic matter from the watershed, or the rise of water kills vegetation along the banks, there is a sudden change to abnormal condition that cannot be immediately met by natural means.

One of the causes of considerable danger in the case of large reservoirs is that known as the "overturn," or the rising to the surface of the lower layer of the water which brings with it a greater or less amount of partly decomposed organic matter that has accumulated in such layer.

Another very important problem in connection with a large watershed is the prevention of any acts or conditions thereon that will tend to pollute the water, and especially those that may introduce pathogenic bacteria into it. This preservation of sanitary conditions on the watershed (and by this we mean all of the area draining either directly into the reservoir or into any of the streams that feed it) calls for eternal vigilance and frequently for legal action as well as physical treatment. Where pollution of the feeding streams cannot be prevented by law, or where the remedies which the law provides involve expenditures too burdensome for the city or water company to assume, it may be necessary to install small plants for purifying such streams before they enter the reservoir.

CARE OF EMBANKMENTS.

The outer slope of a reservoir embankment must, in most localities, be protected from wash by rain. The washing out of gullies or other removal of the soil from the outer slope is generally prevented by growing grass upon it, or sometimes by paving it with loose stones. In protecting the banks by vegetation it should be remembered that it is the roots that are effective in preventing wash rather than the part of the vegetation above ground, and that such kinds of grass or similar vegetation should be used as will provide the most abundant mass of roots, part of which penetrate several inches into the ground, and such as are perennial, the roots retaining their vitality throughout the winter. In different sections of the country different kinds of grass will most fully meet this requirement, and for each case there should be selected that kind which flourishes well in that locality.

There is frequently considerable difficulty in starting sod on the outer slope, because the seed or young sprouts are washed out by the rain before they become sufficiently well rooted to prevent this. This difficulty can be met by covering the slope with sod removed from some other locality. Where this is done, there is danger that the soil under the sod may be softened by rain and the entire mass of sod slide toward the bottom of the slope. To prevent this, it is well to drive stakes through the sod well into the ground (6 to 8 inches is the length generally employed for firm ground and 15 to 18 inches is probably the maximum length required for such stakes). It will not generally be necessary to stake down every piece of sod, but if all of the sods in each of several contour lines spaced about five feet apart be firmly staked, these will generally serve to prevent the slipping of the five-foot strip of sod immediately above them. The sod should, of course, be watered frequently after it is first placed. Such watering should be thorough, in order that the water may penetrate into the embankment and thus encourage the roots of the sod to take hold, but the water should not be delivered in such large streams as to wash out the

soil between or under the sods. This generally means long-continued watering with a sprayed stream.

Where the sodding of the entire bank is considered too expensive, "spot" sodding may be adopted, or the placing of sods at regular intervals all over the bank, each sod being staked in place, relying upon the grass to spread gradually from each sod until it covers the area immediately surrounding it. Where this is done, there is a tendency to a washing away of the soil between the sods, and this must be watched and any soil so washed away must be replaced. This washing can be minimized by laying sod in continuous lines at different levels of the embankment to serve as water breaks, leaving strips of say five feet between them and spot-sodding these strips.

Newly laid sod should be thoroughly pressed into the earth, as by the use of rollers; but it is hardly practicable to roll the steep face of an embankment, and the sods are usually rammed into place by hand, a tamper with a large face being used. It is desirable to keep a close watch of the sod during the first season, and any which appears to be loosing its bond with the embankment at any time should be retamped at once. For this purpose, and for all work done on the embankment during the first season, it is desirable to use planks with cleats nailed to them, laid upon the slope, for the purpose of reaching any points above the base of the slope, since endeavoring to climb the bare slope would result in tearing the sod loose and making holes in it. Instead of such cleated plank, an ordinary ladder can be used if more convenient.

The cutting of the grass on an embankment slope ordinarily cannot be done at all by means of a horse-drawn lawn-mower, nor by a hand mower of the ordinary type, except when the mower is held to position on the slope, as it is pushed forward, by means of a rope manipulated by a second workman walking along the top of the slope. Probably a more common plan is to mow the slopes with a scythe. This is considerably less expensive than the use of two men and a lawn mower, but it does not permit keeping the grass cut as smooth or as short, as a result of which the stalks are coarser and the effectiveness of the sod in preventing wash is not quite so great. Where the reservoir is at some distance from a built-up section and where it is not developed as a park, this matter of trimming grass is frequently omitted almost altogether, possibly being done only once a year. This results in coarse stalks separated by considerable intervals and thus permitting more or less erosion of the earth between them.

In some cases, especially where stones have been found abundant in excavating for the reservoir and the embankment, the face of the embankment has been lined with stone instead of sod. Where stones are placed directly on a bank without the intermixture of fine material, rain water penetrates directly to the earth surface and flows over such surface to the bottom of the slope, such flow being concentrated into channels by the stones. There is thus a tendency to wash away the earth at the top and mid-height of the bank and deposit the earth so washed in the interstices of the stone at the bottom. The washing effect is greatest at about the middle of the bank, thus causing the stone to settle there and give the face of the bank a dished form. If this continues to any great extent, it ultimately results in the stones on the upper part rolling or sliding down into the depressed middle and a general collapse of the facing. This can generally be avoided by carefully spreading and compacting on the earth slope, before laying the stone, a layer of gravel of graded sizes (but including little of less than quarter-inch size), thoroughly mixed and compacted so as to resist the erosive effect of the water that enters through the facing of larger stone. A further precaution that is recommended is to use an abundance of gravel, during the laying of the larger stones, to fill as thoroughly as possible the interstices between these stones.

The top of the embankment offers little difficulty. Undoubtedly the best as well as the most common plan is to sod this or seed it so as to cultivate as soon as possible a sod over the entire top surface, except such space as may be used for a path. The top surface should not slope toward the reservoir so that drainage from it shall enter the basin; on the other hand, it is not desirable that water from the top shall flow to and down the outside slope of the reservoir, unless it can be assured that water so flowing will not collect in small rivulets in so flowing. The safest plan probably is to provide a gutter along the outside edge of the bank with gentle slopes towards points 100 to 200 feet apart, at which point provision is made for conducting the water towards the base. These gutters may be merely sod gutters, or depressions lined with sod. For carrying the water down the slopes, sod gutters may be used, particular attention being given to placing at the outset the best obtainable sod in these slope gutters and staking each sod down carefully and thoroughly. Or concrete or cobble gutters may be used for carrying the water down the slopes. Attention should be given to keeping the grass cut short in all gutters, leaves and trash raked out of them, and the sod held firmly in place on the slope gutters and dished enough to prevent the water overflowing to sod not so well calculated to resist its action.

In climates where sod does not grow readily, and stones and gravel are not abundant, the embankment slope may be covered with a thin layer of cement concrete or mortar. The use of the cement gun is suggested by its use for facing slopes in the work of the Panama canal.

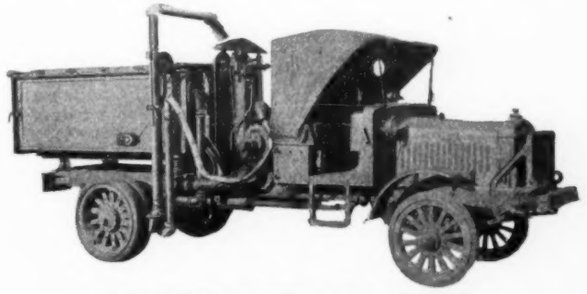
CLEANING SEPTIC TANK AT CAMP LEE.

In our issue for August 24th we described work done in cleaning out septic tanks at Camp Meade which had filled up almost solid with sludge and scum. This work was done by use of an Otterson "Auto-Eductor." More recently the same appliance was used for a similar purpose at Camp Lee, Virginia. The official report on this, made by Capt. H. W. Jones, Acting Utilities Officer at that camp, to the chief of the Construction Division at Washington, is as follows:

1. The Otterson Auto-Eductor, mounted on a three-ton truck, arrived at Camp Lee, Va., Nov. 20, 1918, and has been given a test on removing grit from the grit chambers at the septic tank. The following results were obtained:

2. The truck was placed so that sewage could be pumped from the distributing chamber through about eight feet of four-inch w. i. suction pipe. This sewage was used to operate the eductor, which works on the same principle as a steam jet. The sewage was delivered to the eductor through one hundred feet of three-inch w. i. pipe at a pressure of sixty to sixty-five pounds. The grit and sewage were discharged from the eductor through about fifty feet of four-inch w. i. pipe.

3. The test was started by cutting out one grit chamber



AUTO-EDUCTOR USED AT CAMP LEE.

by closing the timber gates. These leaked badly, but the greater part of the leakage was stopped before running the test. The eductor was then used to pump the sewage out of the compartment, as it does not appear feasible to pump out solids so heavy as sand and gravel under water; after removing the sewage, the grit and sludge was washed down to the eductor by playing two one-half-inch streams upon it continuously.

4. One hundred and sixty-eight cubic feet of material consisting of sand, gravel, rags, sticks, bones, etc., were removed in one hour and eleven minutes—or two and one-third cubic feet of solids per minute. It required one mechanic to operate the pump, and three laborers for the eductor. It would be possible to operate with one mechanic and two laborers.

5. The material removed would have been very difficult to handle with shovels, as it consisted largely of rags. The eductor experienced no difficulty in handling these rags, but was choked frequently by bones and solids which were too large to pass through the two and one-half-inch throat into which the one-inch nozzle discharges. These stops could be removed in the majority of cases by stopping the pump momentarily, whereupon the choke was forced out by the back-flow of water in the discharge pipe. It is necessary in some cases, however, to raise the eductor and remove the cause of the choke by hand, which takes but a few seconds.

6. It appears from the test made that the eductor will handle satisfactorily the type of material usually found in grit chambers. It is thought that the test made was severe in that the material handled was the hardest material to be removed by any process. The relative cost of this method of removal in comparison with other possible methods is not gone into here, but it may be obtained from the data given in paragraphs two and four. This office does not feel justified in expressing an opinion as to the usefulness of this machine until further test runs have been made. A report as to its operation on sludge will be forwarded as soon as the sludge beds now under construction are completed.

In this connection we may quote from a report by Ezra B. Whitman, major, Quartermaster Reserve Corps, in charge of utilities at Camp Meade, concerning the operation of the eductor described in our article above referred to. After describing the apparatus, Major Whitman said:

3. Of the eight compartments in these tanks, one compartment had been fully cleaned out and three remaining compartments on the south side had been partially cleared. The eductor was started on the first compartment and the pumping time required to clean this compartment was eleven hours. This compartment was filled with sand, rags, sticks, brushes, and it had been impossible to make any progress in cleaning it through the sludge pipe provided for that purpose, although a centrifugal pump was installed on the end of this pipe line to produce suction. The eductor operated without difficulty excepting the sticks and pieces of wood and in one case a ball about the size of a croquet ball which was drawn into the opening through which the sludge passed, stopped it completely. The fourth compartment on the south side was cleaned out at the rate of 300 gallons per minute and at this rate it would have taken approximately five hours to clean the compartment.

4. The amount of water used in the removing of the sludge from the fourth compartment with an estimated pressure at the nozzle of this eductor of between 60 and 70 lbs., is approximately one gallon of water for every gallon of sludge removed. It would naturally be expected that with the heavier sludge in the first compartment, a larger quantity of water would be required. The machine is also used experimentally to excavate sand and gravel for a short time and did this work very satisfactory in the same soil adjacent to the sewage disposal plant.

5. It is believed that this machine will handle the sludge from the septic tanks far more satisfactorily than any other apparatus that could be used. Centrifugal pumps become clogged with the rags and other materials in the sewage which passed through the eductor. A clam shell bucket, orange peel bucket would handle the stiffer material in the scum but would not handle satisfactorily the comparatively thin sludge which lay below the stiffer scum.

6. If this machine could be purchased as it stands it would be a very valuable addition to the camp. The five-ton truck would be available for use by dismounting the machinery and at the times when it would be necessary to use the eductor for such purposes as cleaning the septic tanks, the machinery could be very readily placed back on the truck.

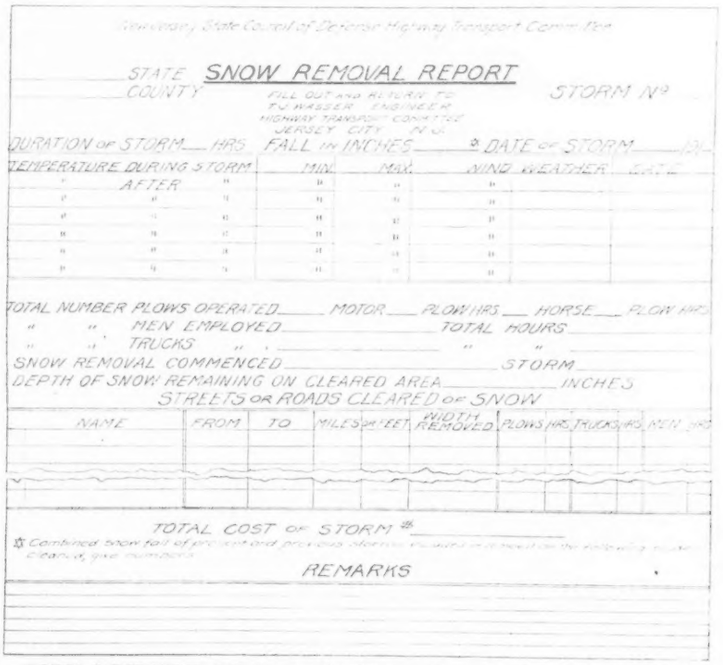
NEW JERSEY PLANS FOR KEEPING ROADS CLEAR OF SNOW.

Under the leadership of the Highways Transport Committee of the New Jersey State Council of Defense, representatives of this committee, members of the Boards of Chosen Freeholders of the counties, engineers, and supervisors have decided upon a plan for keeping highways of that state clear of snow during the present winter.

The snow removal will be done by the counties, not by the state, as is the practice in many cases. It is planned to clear the main highways, and other roads in the densely populated counties, practically down to the road surface; while in outlying roads and sparsely settled counties, snow drifts will be opened up and snow removed to within four or five inches of the road surface, which will permit operation of sleighs but not interfere with the movement of trucks.

First attention will be given to roads on the Buffalo-Baltimore route and on that connecting Phillipsburg with Elizabeth and Jersey City.

Weather reports giving advance notice of threatening snow storms are to be distributed to the road supervisors seventy-two hours in advacne.



Secretary State Council of Defense Highway Transport Committee

STATE
COUNTY

SNOW REMOVAL REPORT

STORM No.

FILL OUT and RETURN TO T.J. WASSER ENGINEER HIGHWAY TRANSPORT COMMITTEE JERSEY CITY, N.J.

DURATION OF STORM ___ HRS. FALL IN INCHES ___ * DATE OF STORM ___ 191

TEMPERATURE DURING STORM	MIN.	MAX.	WIND	WEATHER	DATE
" AFTER "	"	"	"		
" " "	"	"	"		
" " "	"	"	"		
" " "	"	"	"		
" " "	"	"	"		
" " "	"	"	"		

TOTAL NUMBER PLOWS OPERATED ___ MOTOR ___ PLOW HRS ___ HORSE ___ PLOW HRS
" " MEN EMPLOYED ___ TOTAL HOURS
" " TRUCKS " " " "
SNOW REMOVAL COMMENCED ___ STORM
DEPTH OF SNOW REMAINING ON CLEARED AREA ___ INCHES

STREETS OR ROADS CLEARED OF SNOW

NAME	FROM	TO	MILES	FEET	WIDTH REMOVED	PLOWS HRS.	TRUCKS HRS.	MEN HRS.

TOTAL COST OF STORM *

* Combined snow fall of two successive storms may be reported on the same report if cleared, give numbers

REMARKS

FORM DESIGNED BY T. J. WASSER FOR USE IN TABULATING SNOW REMOVAL DATA. HALF SIZE.

T. J. Wasser, engineer of Hudson County and of the Highways Transport Committee, has outlined plans for the actual work of snow cleaning and has compiled a form (which has been endorsed by the Highways Transport Committee at Washington) by use of which those in charge of the work in the twenty-one counties can tabulate data, important for reference, as to conditions, cost, equipment, men employed, etc. These forms are 8 by 13 inches in size and are made up in pad form.

Municipal Journal

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Contributions suitable for this paper, either in the form of special articles or as letters discussing municipal matters, are invited and paid for.

City officials and civic organizations are particularly requested to send to Municipal Journal regularly their annual and special reports.

Information Bureau.

Municipal Journal's Information Bureau, developed by twenty-one years' research and practical experience in its special field, is at the command of our subscribers at all times and without charge.

1919 A HAPPY NEW YEAR.

Municipal Journal hopes that 1919 will indeed be a happy and prosperous year for all its readers; more, it has confidence that it will be. The war is over practically, even though it may not be legally, and such few restrictions as were imposed by war conditions will, we believe, be removed or vanish of themselves within the next few weeks. Labor and materials will again and shortly be abundant. Municipal bonds, also, should find a ready sale; thirty million people have become holders of government bonds and it should not be difficult to persuade them to keep up the practice by the purchase of municipal bonds. (Over-the-counter sales is our tip for this year.)

Given these favorable conditions, prosperity for the cities would seem to wait only on the confidence of those in charge of city affairs. The way to resume prosperity is to resume. City public works are believed to have fallen behind at least fifty per cent during 1918 and twenty-five per cent during 1917. Economy and efficiency of maintaining public utilities, as well the public welfare, demand that this accumulated deficiency be made up as quickly as possible. The amount of public work done in 1919 should be at least half again as much as in pre-war years.

We can have prosperity if we will, but it will not come for the mere wishing. If each timidly holds back to see what the others are going to do, nothing will be done, and we will have hard times, labor troubles, "bread lines," failures of merchants, contractors and others—anything but a happy year. On the other hand, if we all prepare for prosperity, plan at once for public works that will put and keep money in circulation, give employment to those who are released from war work, give occupation to plants that have been idle or that, being released from war work, will be idle unless peace work be provided—if, in brief, we pitch into peace work for promoting our own prosperity with half the enthusiasm we displayed in war work to "save the world for democracy," prosperity will be ours. Let's all drive together "over the top" for a prosperous 1919.

FEDERAL INVESTIGATIONS FOR THE PUBLIC WELFARE.

"Aviation has been advanced twenty years by the war," said an aviator to the writer a few days ago. This, he explained, was largely due to the fact that several of the countries, including the United States, had appropriated enormous sums for experimenting on a larger scale than would have been possible for private individuals or companies, or than these countries would have done in peace times.

Under date of December 18 the Bureau of Mines announced that, while employing all its resources and scores of experts for designing engines of death, testing explosives, developing more efficient boiler plants for the navy, and along other lines, it has developed methods and appliances that will be of the greatest service in peaceful pursuits, but which the needs of such pursuits, however urgent, had not called forth under peace conditions. Microphones and geophones, developed for use in detecting the direction and distance of enemy tunneling work and artillery, can be used for determining the location of men entombed by mining disasters. Coal experts, working for the Emergency Fleet Corporation, have developed plans for so changing the design of boiler plants as to get fifteen per cent more power from the coal. War industries made great demands for minerals, and developments of new sources have reached such a point that the bureau makes the assertion: "The metal mining industry has received such an impetus by this war demand that it will be in peace times a much greater and more prosperous industry than ever before."

In proportion to its size and wealth this country was, before the war, far less active than other highly civilized ones in making, through government bureaus, scientific investigations for the general advancement of its trades and manufactures. If the above results are but a few of many that were developed as by-products of eighteen months of war investigation, what might not be accomplished should investigations in all branches of science be carried on continuously by experts retained by the Federal Government for that purpose?

Investigations along many lines are carried on by private companies, but their facilities are limited compared with those that the Government could command, and, more important, the discoveries are embodied in patents or other monopolies that benefit directly only the firms for which they are made and not the whole people.

There are other lines of investigation that do not seem to offer opportunity for financial profit, and such investigations are not made at all unless by the expenditure of public funds. Among such are the methods most suitable for treating sewage or purifying water under various conditions. Several large cities have carried on such investigations, but these were to a large extent independent of each other and based upon local conditions only. Similar investigations are as desirable for smaller communities, which cannot afford them and which, therefore, often are burdened with inappropriate or misfit plants.

Moreover, the investigations too often stop with the designing of the service plant, whereas the careful, scientific study of such plant continued through years of operation would yield information that would be of as much greater value than that derived from the experi-

mental plant, as certainty is more valuable than probability. Study of all plants continued for years by experts all reporting to a central bureau would result in the acquirement of a knowledge of the entire subject more general and profound than is possible under present practice of occasional, incomplete, unco-ordinated investigations.

At present too many scientific men who are adapted by ability and training to make such investigations find that the making of a living requires them to waste most of their time in work that less able men could do as well. Employment of such men by the Government on investigations such as these would permit their talents to be used to the full for the general benefit of the country—a benefit that would far exceed in value the salaries that it would be necessary for the Government to offer to induce such men to devote their lives to this work.

The war has revealed to mankind heretofore unrealized possibilities in united action for the general good. It does not seem possible that we will not profit by some, at least, of the more apparent, and adopt permanently principles of action forced on us by war necessities. Is not one of these lessons the advantage that the whole people would derive from vastly broadened, co-ordinated, scientific investigations of technical matters that have a bearing upon public health and welfare?

SOUTH HAVEN WATER WORKS AND SEWERS.

The cost of pumping water during 1917-1918 at the municipal plant of South Haven, Mich., was as follows, in cents per thousand gallons: Coal—1.68 cts.; power house, repairs, supplies—0.11 ct.; labor, engineers and firemen—0.76 ct.; sterilizing—0.54 ct.; line repairs and maintenance—0.49 ct.; attention to service—0.40 ct.; general expense—0.66 ct.; interest on bonds—1.39 cts.; depreciation—1.84 cts. Total cost—7.89 cts.

In charging off depreciation on the books of the water plant, the city used rates as follows: Pipe lines and hydrants, 2 per cent; intake, 3 per cent; buildings, 4 per cent; plant equipment and standpipe, 6 per cent; meters, 8 per cent. Average rate for the entire plant, 3.63 per cent.

For the purpose of billing, the city is divided into three sections, one of which receives bills in January, April, July and October; another in February, May, August and November; and the third in March, June, September and December. This permits the meter readers and billing clerks to work continuously throughout the year.

The city makes a charge of $10.75 for running a ¾-inch service from main to lot line.

For a 4-inch sewer connection from main to lot line, where the depth at main does not exceed 8 feet, the city charges 29 cents a foot; when the depth is between 8 and 9 feet, 32 cents; between 9 and 10 feet, 35 cents; between 10 and 11 feet, 39 cents; between 11 and 12 feet, 42 cents; and if over 12 feet, a special price.

The Board of Public Works keeps itemized cost records of sewer construction in considerable detail. As an illustration, the cost of laying 2,620 feet of 8-inch vitrified pipe sewer is given:

Distribution of Cost of Sewer Construction.

Location of Sewer	Phillips street
Character of soil	Blue clay and quick sand
Kind of pipe used	8-inch vitrified clay tile
Average depth	7.8
Total length	2620
Number of manholes	6
Number of flush tanks	1
Cost to Construct.	
Preliminary plans and estimates	$42.50
Advertising bonds and printing	50.70
Assessors	6.00
Tile	644.84
Contract labor (Gen. Gas Const. Co.)	332.59
Other labor	758.57
Material for manholes and flush tanks	130.05
Additional material (cement, jute, straw)	78.50
Engineering and supervision	98.50
Incidentals and use of tools	65.50
Cost to repair streets and walks	205.50
Total cost	$2,413.25
Cost per lineal ft	0.921
Cost per front ft	0.470

WASTE PRODUCTS OF CITIES AND THE WAR*

Need of Waste Products for Fertilizers—Methods of Disposal of Sewage, Street Sweepings, Trade Wastes, Dead Animals, and Garbage—Incineration—Reduction—Feeding to Swine—Effects of War.

By W. T. KNOWLTON.†

The waste products of cities may be divided as follows:

1—Ashes, produced from the combustion of coal and wood.

2—Rubbish, consisting of paper, wood, rags, furniture, leather, rubber, lint, hair, metals, glass and crockery.

3—Sewage, consisting of street and roof drainage of rain water, water from street washing, liquid trade wastes and house sewage.

4—Street sweepings, consisting of horse droppings, leaves, materials from excavations and construction and pavement dirt.

5—Trade wastes, consisting of stable refuse, sawdust and refuse of a non-liquid character from manufacturing plants.

6—Dead animals, comprising horses, cows, swine, dogs, cats and poultry.

7—Garbage, comprising that from hotels, markets and slaughter houses, as well as that from households.

*Paper prepared for the convention of the League of California Municipalities, which was set for October 15th to 18th, but called off on account of the influenza.

†Engineer of sewers of Los Angeles, Cal.

NEED OF WASTE PRODUCTS FOR FERTILIZING PURPOSES.

In analyzing the values of the waste products, their availability for use as a fertilizer is considered of prime importance. It is frequently necessary that in the raising of crops a substance shall be added to the soil which will replace the material removed therefrom by the harvesting of the crops. These substances which are added are called plant foods and comprise potash, phosphoric acid, nitrogen and lime. The potash to be added is found as salts of potassium, in the form of sulphates or chlorides; and the phosphoric acid, as bone phosphate (ground bone), or rock phosphate, which is usually treated with sulphuric acid (acid phosphate). The nitrogen occurs as salts of ammonia (ammonium sulphate), nitric acid salts (sodium nitrate), or as animal or vegetable compounds containing nitrogen, as cottonseed meal and fish scrap. The lime is found as ground limestone or as slaked or unslaked lime.

The potash previously imported has come almost wholly from Germany. The ammonium sulphate is produced from coal, when distilled to prepare illuminating gas, and

the limestone is found in extensive deposits. The ammonia is the only one of the four plant foods which is scarce, and accordingly for fertilizer purposes it is important to recover what is obtainable from the waste products of cities. The amount of nitrogen per capita from such products may be insignificantly small, but the aggregate is of very large proportion.

METHODS OF DISPOSAL.

On account of the rapid growth of cities and the war conditions, the need of recovery of those portions of these wastes which can be of value to mankind is becoming more apparent every day. This leads to a description of the methods of disposal of the waste products of cities.

Ashes.—Ashes are generally used for fills and roadwork. As they may contain a certain percentage of unburnt coal, ashes, in some instances, have been combined with garbage for incineration. Where oil and natural gas are used in cities for fuel, it is not practical to count on any unburnt coal in the ashes.

Rubbish.—The disposal of rubbish is today receiving more attention than ever, and in many places paper, which had previously been sent to the disposal plants, is now being saved. This is collected by the Red Cross and other organizations. In Los Angeles, the paper thus collected averages 10 tons per day, which is sold so as to produce a fair revenue. Rags collected are also of value, although their percentage of the total amount of rubbish is small. In Los Angeles the rags collected are less than half a ton per month. Tin cans when not rusted have a value. They can be treated for recovery of the steel used in their composition. In one city they averaged 11-3 tons per thousand per year. When baled and pressed they can be made into weights. A price of $4 per ton is paid to those who deliver tin cans to be recovered as above mentioned at a plant in Los Angeles.

Sewage.—The treatment of city sewage has generally been satisfactory and has as a rule resulted in the production of precipitated insoluble residue known as sewage sludge, which has some value for fertilizer purposes. The average sludge contains about 80 per cent moisture, and 20 per cent dry material, the latter consisting of 55 per cent mineral matter and 45 per cent organic matter. This sludge contains about 1½ per cent of nitrogen and 6½ per cent of fats. Analysis of sewage sludge obtained by the writer from Imhoff tanks in Wilmington, San Gabriel, Anaheim and Fullerton in Southern California show a nitrogen content varying from 1 per cent to 2½ per cent. On account of the high water content, the sewage sludge is not so well adapted for a fertilizer as other waste products, but it, however, keeps the soil moist. It is estimated that the average per capita yield amounts to 10½ ounces of sludge per day, which would give a city of 100,000 population 33 tons of sludge per day, or 12,000 tons per year. This would yield 2,400 tons of dry sludge per annum. It is then estimated that for the 199 cities of the United States, each of which have a population of 30,000 or more, there would be produced 720,000 tons of dry sludge per year.

The nitrogen content of dry sludge is about the same as that of soft coal. When the coal is distilled, the larger part of the nitrogen is recovered as ammonia, which amounts to 1 per cent of the weight of the coal. The dry sludge would accordingly yield 7,200 tons of ammonium sulphate each year, which would have a value of $480,000. It is estimated that the combustible gas from sludge averages 64 per cent of that from solt coal.

The disposal of packing house waste has been a problem in Chicago for some time. It is considered by some that the activated sludge process will now solve this problem. In the Sanitary District of Chicago, 2,420 lbs. of dry solids per million gallons of sewage were collected in nine months. By the use of acids (6 lbs. of H_2SO_4 per thousand gallons of sludge) the sludge shows a higher nitrogen content, although the effect varies on different sewages. At Ft. Worth, 11,000 lbs. of dry solids were recovered per million gallons. Pressed sludge cakes have from 5 per cent to 6 per cent of nitrogen on a dry basis.

The fine screenings preliminary to aeration also have value. On a 30 mesh screen between 500 lbs. and 1,200 lbs. of dry material per million gallons were recovered, which at 80 per cent moisture contains nitrogen of manure value. If not screened, the screenings act as a fibrous binder, which aids the pressing. The grease recovered is worth between 4c and 7c per lb., depending on normal or war conditions. When dry, the activated sludge, if containing 5 per cent ammonia, is worth between $12 and $18 per ton when varying from normal to war conditions.

Street Sweepings.—An analysis of street sweepings contains the following:

Nitrogen	0.44%
Moisture	32.24%
Organic Matter	19. 9%
Phosphoric Acid	0. 1%
Potash	0. 2%
Ash	47. 8%

The nitrogen contained in sweepings varies in value from 30c to $1.28 per ton. It is estimated that the average collection per year for 1,000 people amounts to 169 tons. Of a total amount of 1,065,000 tons of sweepings collected in 1897, only 175,000 tons were used in fertilizing.

Trade Wastes.—It is estimated that the total amount of sweepings from the 199 cities above mentioned is over 5,000,000 tons per year. Oil from the automobiles lessens the value of this product. The solids from tanneries have some fertilizer value. Sulphide wastes from paper plants, and the skin of vegetables and fruits, which are a waste product of canneries, also have value. In this connection the recent savings of peach stones can be noted.

Dead Animals.—In regard to dead animals, rendering is recommended and it is estimated that the tankage therefrom amounts to 8 per cent nitrogen, and 10 per cent bone phosphate, which products are worth about $20.00 per ton. The products recovered from a dead horse are considered to be worth about $10.00. It is estimated that the annual yield in dead animal tankage is 8,500 tons, which is worth $170,000. This raw material has a gross weight of four tons per thousand population per year, and at the prevailing price it is estimated that this material should yield $500,000 for the 199 cities above mentioned.

Garbage.—With the exception of the disposal of sewage, which for the time being may be considered, on the whole, as solved, it may be said that the disposal of garbage presents the most bothersome of municipal problems. If a city gives away its garbage, it is giving away something which has value. Other than the item of revenue there are three fundamental factors to be considered in the choice of the method of disposal of garbage, viz:

1st. Cleanliness, and freedom from nuisance.

2nd. A sufficient capacity to handle all garbage produced, and

3rd. Economy of construction and operation. The methods used for the disposal of garbage are incineration, reduction, feeding to swine, burial and dumping, the last two being of not much economic value.

An analysis of garbage shows that the average weight varies from 1,100 to 1,400 lbs. per cubic yard, and that it may contain a small percentage of paper, rags and metals, a small amount of glass and bones, some straw and wood, and larger percentages of dust and ashes. The water content of garbage has been estimated at 70 per cent. Garbage contains from 2 per cent to 4 per cent of grease, and from 15 to 20 per cent of tankage. To show its value at the present time, it has been stated that one ton of garbage will produce sufficient glycerine to manufacture an explosive charge for 14 shells of the French 75 m.m. type, sufficient fatty acid for the manufacture of 100 12-ounce cakes of soap, and enough fertilizer for 8 bushels of wheat.

INCINERATION.

For disposal by incineration, fuel other than the refuse is sometimes used, although some coal may be found in the garbage. The cost of construction of an incinerator varies from $200 to $1,000 per ton daily capacity, an average price being $600. The cost of operation and maintenance may vary from 50c. to $3.00 per ton. In Ohio the cost was found to vary from $1.00 to $2.60 per ton. For a 100-ton plant it is considered that the labor required will be 50c. per ton, the cost of collection, an additional $2.00, making a total of $2.50 per ton of garbage for collection and disposal. The revenue from this method of disposal consists of the steam and clinker. As the period when the steam is needed does not generally coincide with the period of the operation of the plant, it is not easy to work out an economical plan for this method. It would be better, when this method is used, to have the refuse burned at night in order to run the electric light plant. As a rule, no odors from this method occur, so that plants can be located in the center of the city.

REDUCTION.

In the reduction process of garbage treatment, grease and tankage are obtained, the following process being used: The garbage is cooked in steam, then pressed to remove the water and grease, then dried and washed with gasoline to recover the remaining grease, then ground and sacked. It is estimated that the loss of gasoline after repeated use is 6 gallons per ton of dry tankage. The tankage, which is used as a fertilizer, is composed as follows:

Water	3.5 per cent
Ammonia	3.4 per cent
Bone phosphate	5.5 per cent
Potash	1.3 per cent

The tankage in the market varies in price, depending upon its condition, an average wholesale rate being $6.50 per ton, or $2.65 per unit, 1 unit being 1 per cent of nitrogen. The grease recovered is valued according to its quality, a wholesale price of $0.05 per pound being obtained in 1916.

Plant at Columbus. It is estimated that the cost of construction for disposal by reduction averages $287.00 per daily ton capacity, with the cost of operation varying from $1.50 to $2.50 per ton of garbage. The revenue obtained in three reduction plants in Ohio shows an average of $1.32 per ton. As the Columbus plant has been quite successful, the following figures are given: This plant treats about 22,000 tons per year, the population tributary being 215,000 and the garbage per capita, per year, being 203.3 pounds. In 1915 the cost of operation per ton of garbage was $1.94, and the earnings were $2.42, leaving a revenue of 48c per ton. In 1916 the cost of operation was $2.22, the earnings $4.05, and the revenue was $1.83. The Columbus garbage yielded 3.08 per cent of grease, worth 5c per pound, or $3.18 per ton of garbage; also, 10.3 per cent of tankage worth $8.00 per ton of tankage, or 81c per ton of garbage.

Most reduction plants are owned and operated by private concerns; those in Columbus, Cleveland, Dayton, Chicago and Schenectady being exceptions. In two cities only, where private companies operate the plants, is a revenue given to the city, these cities being New York and Los Angeles. In New York the revenue paid to the city is $112,500 per year and in Los Angeles a revenue is obtained of 51c per ton of garbage treated.

The present annual production of garbage tankage is approximately 150,000 tons, worth $975,000 per year, which amount is obtained from 1,200,000 tons of raw garbage reduced in twenty-five plants. From cities in the United States of 30,000 and upward, it was estimated that in 1909 the total garbage collected amounted to 2,700,000 tons, from which it was considered that 400,000 tons of dry tankage worth $2,500,000 could be obtained.

Today twenty-nine of the larger cities dispose of their garbage by reduction, and obtain 36,000 tons of grease and 150,000 tons of tankage yearly, which materials have a value, at present prices, of $11,000,000. The grease recovered has a glycerine content sufficient to produce 5,000 tons of nitroglycerine.

FEEDING TO SWINE.

The last method of garbage disposal to be described is that of feeding to swine, and it is noted that out of 112 cities, thirty-four in 1915 so disposed of their garbage.

Of sixty-six cities having a population of over 100,000 in 1916, twenty disposed of their garbage by feeding to hogs, whereas out of five hundred and forty-four cities having a population between 10,000 and 100,000, two hundred fed their garbage to hogs. As a result of these facts, it is considered that the waste from a population of over 8,000,000 is being fed to hogs, which waste would be sufficient to produce 40,000 tons of pork per year. Assuming that but one-half of this is available, the pork would at its present price have a value of $6,000,000. It is estimated that if garbage now destroyed in cities having a population of between 10,000 and 100,000 were fed to hogs, 15,000 tons, valued at $5,000,000, would be available. The garbage produced depends on different conditions, a larger amount of vegetable matter being found in the south than in the north.

It has been said that in making a comparison between the two systems of disposal by reduction and by feeding to hogs that from a monetary viewpoint both methods are practically identical. Improvements can, however, be made in the reduction process, and it is noted that the larger the city the less adapted the garbage is for pig feeding. Furthermore, larger cities have more difficulties than smaller ones in the control of material collected.

Concerning the sanitary aspects of feeding to hogs, no good theory has been advanced why garbage is bad for hogs. The infection of hogs applies no more to those fed with garbage than to those fed with grain, the per cent in one city being 1 to 20 in favor of the garbage fed hogs. In Massachusetts over 90 per cent of the hogs raised are garbage fed.

It has been noted that 100 hogs will eat a ton of household refuse a day. Hotel refuse is considered to be worth ten times that from the households. At a production of 200 pounds of garbage per capita per year, a population of 1,000 would support twenty-five hogs. It is estimated that feeding garbage to hogs adds about one pound per day to their weight. In using this method of disposal, care should be exercised in the collection, and proper ordinances enacted to eliminate glass and similar substances, which are certainly detrimental to the welfare

of the hogs. The householders should be advised by the authorities, wherever garbage is so fed. It is considered that the collection of the garbage is a public utility, whereas the disposal may be a private affair. The importance of this method of disposal was considered at a recent conference held in Chicago on the subject of garbage piggeries. The following information concerning municipal hog farms will be of interest: In 1916 New Haven, with a population of 52,000, fed its garbage to pigs and received in turn $16,000 for pork. A revenue of the same amount was received in Brockton, which paid $30,000 for the collection and operation of its pig farm. In Worcester for the year ending 1917, $15,000 was spent for its pig farm and a net revenue of about $37,000 was obtained by this method of disposal.

In some other cities this method of disposal brought in a revenue which averaged from $0.45 to $1.00 per ton.

The area required for pig farms should be an acre for fifty animals; when under cover, the number of hogs may be increased. In the Worcester farm 2,000 pigs have an area of forty acres. Hull, Massachusetts, maintains a municipal garbage piggery of three hundred and twenty-five hogs, where the citizens own a share in the farm by paying for the feed and cost of maintenance. One man feeds the entire herd, and uneaten garbage is taken away each day before any more is fed. This system is recommended elsewhere by the Department of Agriculture.

Topeka, Kansas, has a city piggery containing eight hundred hogs on a fifteen acre tract.

To handle twenty tons of garbage per day it is estimated that an investment of $5,500 per ton per day is required to establish a plant, which does not include land that may be worth from $5,000 to $10,000. The cost of operation of such a farm would be $2.65 per ton of garbage. For a farm of fifty tons daily capacity it is estimated that the cost would be $1.98 per ton. The revenue by this method of disposal is estimated at $6.85 per ton for a twenty ton per day plant. For a plant which could handle sixty tons per day, it is estimated that the revenue per year would average $3.65 per ton.

EFFECTS OF WAR ON GARBAGE DISPOSAL.

Regarding the effect of the war on the disposal of garbage, it should be noted that such waste products should be removed from cities and disposed of in a sanitary manner. While the amount of municipal work has necessarily been reduced, nothing should be suspended or left undone which is essential to the physical well being of the community, and accordingly the waste products of cities should receive and be given all necessary attention. Furthermore, the conservation of food will require that the attention of municipalities be given to the disposal of their wastes as much after the war as at the present time.

Decrease in Garbage. The decrease in both quantity and quality of garbage on account of the war has been noted, which decrease is due to the increased cost of food as well as its conservation. The recent demand of the authorities in Chicago for more garbage shows the awakening of interest in its value. It has been found on investigation that the decrease in the amount of garbage has varied among several cities from 10 per cent to 25 per cent. The cities of Milwaukee, Rochester, Columbus and Chicago show a decrease of between 18 per cent and 24 per cent in 1917, as compared with the production in 1916. This percentage refers to the total quantities of garbage collected and not to the production per capita. Out of sixty cities, it is noted that the decrease averages between 12 per cent and 15 per cent. This decrease would be lessened if the private collections were stopped. The vegetable waste from home gardens also tends to retard this decrease.

As a better indication of the effect of the war on this matter, examinations should be made of the quantity of grease recovered per ton of garbage. In two cities, namely, Boston and Los Angeles, it has been found that the decrease in the amount of grease per ton of garbage has been 23 per cent and 13 per cent respectively. In this connection attention is called to the diagram which the writer has prepared showing the tonnage collected by the City of Los Angeles and treated at the plant of the Pacific Reduction Company during each month of the past three years. By reference to this diagram it will be noted that, as a rule, the tonnage collected has been less during each month than that of the corresponding month of the year previous. Photographic copies have been made of this diagram and can be obtained of the writer.

Increased Value of Products. The effect of the war on the production of garbage shows an increased value in the products obtained from the disposal by reduction and hog feeding. Pork has advanced from $8.00 and $10.00 per hundred pounds to $15.00 and $16.00, and grease, which in 1914 was 4¼c per pound, advanced to 7½c per pound in 1917, and is now worth from 11c to 12c per pound. The food conservation may, however, reduce to some extent the products recovered from garbage.

To illustrate the increased value of waste products, reference can be made to bids recently received by the United States Government at the Ayer cantonment. These bids are for the removal twice daily of seventy tons of manure, ten tons of kitchen garbage, and a large amount of cans, paper, fat, bones, grease and dead animals. The proposals received varied from an amount of $72,000, which the bidder specified should be paid to him by the Government, to an amount of $21,600, which the bidder offered to pay to the Government. The specifications for this work required that the successful bidder should furnish all containers required. One other illustration of the value of fats is shown by a recent note in a Berlin paper, which is quoted as stating that nothing has cut so deeply into the daily life of Germany as the lack of fats and the absence of raw materials, one dovetailing into the other. No fat means no soap, no soap means chemical substitutes, chemical substitutes ruin clothes, and clothes cannot be replaced without cotton and wool.

It may be that the thrift movement in this country will require a change in the method adopted for disposal of the waste products of our cities, as the decrease in fats may make reduction hardly worth while. It is suggested that a careful analysis of the garbage of cities be made, and if possible that the larger cities have their chemist departments determine the percentage of fats, starch and organic matter wasted in the garbage. It is considered that the dual collection of garbage and rubbish should be prohibited as the values recoverable will to a large extent be eliminated when both garbage and rubbish are collected in one receptable. Should the time arrive when the reduction of fat and the waste of bread, cereals and meat has been brought to a minimum, the disposal of parings, plate scraps and trimmings will still require that the latter be burned, buried or fed to animals.

CONTROL BY STATE.

It is believed that, if not properly controlled by municipalities, the State Board of Health should exercise authority over the disposal of city refuse. From the viewpoint of a nuisance, garbage is the principal waste product which requires attention, but from the viewpoint of disease spreading, street cleaning is of prime importance. In Minnesota, the State Board of Health controls plans for refuse disposal.

The WEEK'S NEWS

Massachusetts Plans More Highway Work—Weather Reports on New York State Roads—States Work with U. S. in Venereal Disease Campaign—Connecticut to Investigate Water Waste—Hydroelectric Power Development for Dublin—Police Strike in Toronto—Firemen Resign in Colorado Springs—Columbus Citizens to Advise on Finance Problems—Wilmington, Del., Raises Employes' Salaries—Six-Cent Fares in Two New York Cities—Kansas City, Mo., Successful Against Higher Fares.

ROADS AND PAVEMENTS

To Increase State Highway Budget.

Boston, Mass.—Plans for road work in Massachusetts the coming season have been undergoing radical revision recently because of the entire change in the situation brought about by the end of the war. Under the budget plan the highway board had to submit its estimates for next year by Oct. 15, and in drawing them up it pared everything to the lowest possible amount, in accordance with the Government orders and in consideration of the prospective labor market. But now the situation is entirely different and the commission hopes that it will be able to undertake much really necessary peace-time improvement of the roads in its charge. In order to do this, under the budget system, it will be necessary to go before the Ways and Means committee of the legislature and ask that the estimates submitted be materially changed so that the commission may have money with which to carry on construction and maintenance.

To Report on Road Conditions in New York.

Albany, N. Y.—Acting upon the request of Arthur H. Brown, of Auburn, chairman, good roads committee, New York State Automobile Association; the United States Weather Bureau at Washington, and chief meteorologist George T. Todd, Albany branch, together with Peter G. Ten Eyck, regional chairman Highways Transport Committee, National Council of Defence, state and county highway departments, and the New York State Automobile Association have promptly put plans well under way to furnish timely reports of road conditions and sudden changes in the weather along the main highway between Albany and New York and Albany and Buffalo in order to facilitate as much as possible the movement of motor vehicles over this route during the winter months. Such service will prove most valuable to shippers and passenger motor vehicle travel in connection with the plan of the state highway department and the Highways Transport Committee of the Council of National Defence to keep this route passable during the winter by the removal of excess snow. State and county highway officials and local automobile clubs of the New York State Automobile Association, which cover this route, will make prompt reports on road and climatic conditions in their respective districts and localities. These reports, together with forecasts from the United States Weather Bureau, will be immediately available to all users of the highway.

County Spent $2,000,000 on Roads.

Indianapolis, Ind.—A grand total of more than $2,000,000 has been spent in road work by the board of commissioners in Marion county during the three-year period ending October 1, 1918, including contracts for concrete and brick roads amounting to $1,418,290, and repairs to free gravel roads amounting to $730,000. The energies of the commissioners during the last two years have been directed mainly to assisting the government in perfecting roads to Fort Benjamin Harrison, for which contracts were let in 1917 for concrete work on the Pendleton pike and the National road aggregating $185,000. Repairs were made to gravel roads at a cost of $75,000. This year $50,000 has been spent on free gravel roads leading to Fort Benjamin Harrison, and contracts have been let for concrete roads leading to the fort, the aviation repair depot at the speedway, and to the plant of the Stenotype company, which is engaged in war work, amounting to $350,000. Bond issues for road work both last year and this year were limited to roads needed to care for war work traffic, and all other bond issues have been postponed until after the war. By the use of labor from the workhouse and jail, which never has been tried before, thousands of dollars have been saved to the taxpayers. Many commendations as to the excellence of the work under county surveyor Charles E. Cheney, and John J. Griffith, county road superintendent, have been received. Continuous efforts have been and are being made by all county road officials, not only to keep the highways in the best of condition, but to encourage the transportation of farm produce to the city and the delivery of merchandise and manufactured products to the country and surrounding cities by automobiles in order to relieve railroad congestion. In this connection the county road officials, in addition to realizing that the roads must bear the weight of constantly increasing traffic and tonnage, are considering the matter of night haulage and are investigating the question of lighting at least the main trunk lines. A tabulated view of the road costs for the period mentioned is as follows:

	Road Repairs.	Concrete Roads.
1916	$215,000	$800,000
1917	290,000	267,800
1918 to October 1	225,000	1,350,000
Total	$730,000	$1,418,290
Total construction and repairs		$2,148,290

The expenses for roads to Fort Harrison and army productive centers are as follows:

	Road Repairs.	Concrete Roads.
1917	$75,000	$267,800
1918 to October 1	50,000	275,000
Total	$125,000	$542,800
Total construction and repairs		$667,800

Plans made by the county commissioners for the construction by means of a $600,000 bond issue of roads on main trunk lines, to be constructed under the supervision of the state and in co-operation with the federal government, had to be abandoned after the bonds had been authorized, plans and specifications prepared, and lettings advertised because of the decision of the Hamilton county court, declaring the new state highway law null and void.

SEWERAGE AND SANITATION

States Cooperating in Venereal Disease Fight.

Washington, D. C.—"Seven states and the District of Columbia have so far failed to cooperate with the United States Public Health Service in its venereal disease prevention work, although the sum of $188,216.78 is theirs when they qualify for it under the provisions of the Army Appropriation Bill," says Surgeon General Rupert Blue of the United States Public Health Service. The sum of $1,000,000 is to be distributed to the states for the use of their state boards of health, the only condition being that they shall put into operation through legislative enactment or a state board of health regulation having the effect of

law the regulations approved by the surgeons general of the army, navy and the United States public health service. Under these regulations, before any state can secure the sum of money allotted to it, it must adopt laws or regulations requiring the reporting by physicians of all cases of venereal diseases, just as other communicable diseases are reported, and it must make provision for the establishment of clinics for the treatment of these diseases. The District of Columbia has to await the action of Congress to get the necessary legislation which it has asked for; then it will be entitled to its allotment, $3,599.66. The seven States that have not yet fulfilled the requirements and the amounts they are entitled to are: Tennessee, $23,754.87; Missouri, $35,807.91; Idaho, $3,540.13; Michigan, $30,554.57; New Mexico, $3,558.70; Pennsylvania, $83,341.55, and Utah, $4,059.39. I have every confidence that it will not be long until the entire country has fallen in line with the Government's unique effort to clear the land of these social diseases and of the vice which spreads them. But, with demobilization proceeding so rapidly, it is vitally important that the work should go ahead as fast as possible. Certainly the appeals made by President Wilson, the secretaries of the treasury, of war, and of the navy and of the United States public health service must be heeded by all loyal citizens."

To Investigate Cost of Influenza.

Harrisburg, Pa.—An investigation is to be conducted by the state department of health into the cost of the epidemic of influenza, which has taken 47,000 lives. Dr. B. Franklin Royer, acting state health commissioner, has announced that every phase of the social and economic cost of the disease will be surveyed. Doctor Royer has sent letters to men and women in charge of the work of fighting the epidemic in various parts of the state and asked that the information desired be returned at once to the department. "Professor J. P. Lichtenberger, of the Wharton School of Finance, of the University of Pennsylvania," he said, "has been engaged by the department to undertake this work, and a large corps of clerks, stenographers and other officers of the state department of health have been designated to cooperate in gathering the data. Inquiries will be sent to physicians, health officers, undertakers and nurses and later to heads of various business industries."

Health Board Makes Landlords Furnish Heat.

New York, N. Y.—The board of health has made public a report on its efforts to compel owners of apartment houses and office buildings to furnish heat to their tenants as provided in the leases made with them. The report says: "Immediately after the enactment of the ordinance requiring landlords to maintain the temperature of all occupied apartments, where leases had been made requiring them to do so, at 68 degrees (F.) the department of health received a number of complaints of failure on the part of these landlords to obey the ordinance. The procedure in each instance was to have a representative of the department investigate and ascertain the facts and endeavor by personal effort to obtain compliance with the requirements of the Sanitary Code; if unsuccessful, prosecute to secure compliance." During October a total of 2,405 complaints were received. On investigation of these, no cause for action was found in 709 cases. By personal effort, 1,603 cases were abated while only two had to be returned for court action. The total of valid complaints was therefore 1,605, 91 of these being pending at the time of the report. In the first case submitted to the courts it developed during the trial that the defendant had from the time of the adoption of the ordinance by the board of health used every effort to make repairs to a defective heating plant, and after the evidence submitted to the court clearly established this fact the department withdrew the complaint. In the other case, a corporation owning an office and loft building wilfully failed and neglected to furnish heat in accordance with a lease entered into with the various occupants of the building, and the court imposed a fine of $100."

WATER SUPPLY

Contractors Give Up Big Pipe-Laying Job.

Jersey City, N. J.—The city commission, following report from commissioner Fagen on the subject, has decided to relieve Edward P. O'Neill and Joseph Cutley of the $400,000 contract for the laying of an additional water main under the Hackensack and Passaic Rivers to safeguard the Jersey City water system. The city will arrange to have the work completed in the spring by the contractors' bonds men. Thus far the city has paid O'Neill & Cutley about $62,000 on account of work done. The firm has supplied water pipe, but none of it has yet been laid under the river. Much of the pipe is lying on the meadows waiting to be put in place.

To Survey Water Waste Throughout State.

Hartford, Conn.—In connection with the work of the State Council of Defense, Department of Fuel Conservation, Caleb M. Saville, who is manager and chief engineer of the Hartford water department, is to make a survey of water waste in the whole of Connecticut and to study its relation to fuel conservation. As a result, he is expected to submit recommendations for legislation on this subject to the next session of the Connecticut legislature.

Water Rates Raised 20 Per Cent.

Charleston, W. Va.—The state public service commission has allowed the West Virginia Water & Electric Co. to increase its water rates in the city 20 per cent to domestic consumers and an increase on city hydrants from $30 annually to $50 for each hydrant. The order became effective Dec. 1 and will extend to July 1, 1919. By its order the commission finds that the company has been grossly derelict and negligent in failing to provide adequate equipment and facilities such as would enable it to supply its patrons with a sufficient supply of pure, wholesome water as required by the terms of its franchise with the city; and to provide for the increased demands necessary and incident to the rapid growth of the city in population, and has not prosecuted with diligence and dispatch the extension and improvement to its plant that was so obviously needed after it became apparent that the city had been selected as a site for certain large industrial enterprises. The company is required to proceed with all reasonable dispatch in making the improvements now under way, which it is held will be sufficient to enable it to furnish a sufficient supply of pure and wholesome water. The advance in rates does not apply to South Charleston until the improvements required shall have been made. The commission finds that the company's investment is approximately $1,000,000 and that the rates received at present do not furnish adequate returns, the high costs of labor and materials being considered.

STREET LIGHTING AND POWER

Retroactive Rate Increase Declared Invalid.

Richmond, Va.—Thousands of dollars have been saved to the people of Richmond on their bills for gas from the municipal plant following the decision of Judge B. T. Crump, of the law and equity court, in the proceedings to prevent the enforcement of the new gas rate for October when the ordinance was not effective until November 1. The injunction sued out by Jesse C. Duke has been made permanent, to expire by limitation December 31. The opinion of Judge Crump says in part: "October 21, 1918, an ordinance of the city council of Richmond was approved whereby the ordinance fixing the price of gas furnished to the citizens of the city was amended, so as to make the rate, effective on and after November 1, one dollar per thousand feet, instead of eighty cents, as it had been and was under the then existing ordinance. The second section of the ordinance was in the following lan-

guage: 'This ordinance shall be in force from and after November 1, 1918, and shall apply to all bills dated from and after said date.' It would evidently be impossible to have read every meter in the city on the first day of November, which, of course, if done, would have given the exact amount of gas consumed by each taken before and after that period, to which the respective rates would have been applied. The November bills, as originally made out, resulted in a wrong upon the gas takers by requiring them to pay $1 per thousand feet for so much of the gas as was used prior to November 1; and in some instances, as in the case of the plaintiff here, all of the gas appearing in the November bill was consumed prior to November 1, his meter having been read on October 28. This injunction was, therefore, properly awarded. Any unfairness or oppressiveness in putting the new rate into effect, however, has been removed by the method adopted for rebating any prior over charges when the December bills are made out, thus relieving the citizen from the necessity of suing the city for the restoration of over charges. The injunction, which enjoins the city from turning off the gas from the premises of the plaintiff or imposing any penalty upon him, will be continued in force until the 31st day of December, 1918, at which time the injunction will stand expired, and the case may then be dismissed, the city to pay the costs. In the meantime, the plaintiff should pay and the city accept the face amount of the November bill. I do not think any constitutional questions are involved. The solution of the case depends upon the principles of law regarding the fair and reasonable exercises of the franchise granted by the legislature to the municipal corporation to operate a public utility for the benefit of the citizens."

Dublin to Develop Hydroelectric Power.

Dublin, Ireland.—The question of utilizing water power sites on the Liffey River in the vicinity of Dublin for the production of electrical power has lately been receiving serious consideration. It is understood that the Dublin & Lucan Electric Railway Co. is primarily interested in this. The project is attracting the attention of the Dublin Chamber of Commerce, the Dublin Corporation, and the English and Irish Coal Controllers, and it is hoped it will receive the approval of the government, whose assistance is being sought. The idea of utilizing the water power of the Liffey is not a new one. Some few years ago the matter was suggested, but the financing of the undertaking and the then abundant supplies of coal appear to have been obstacles in the way of its realization at that time. More recently the shortage of coal and government control of the electric line have given the matter a different aspect. The directors of the line believe they could abolish the use of coal for its operation and at the same time effect a great saving in coal consumption in other directions. The scheme has thus far met with the approval of riparian landowners and others who would be interested. The estimated cost of carrying out the project is roughly $250,000. Apparently there would be no difficulty in finding users for the power that would be developed. Inquiries have already been made, it is claimed, for horsepower totaling more than 3,000, which exceeds the horsepower it is expected would be developed at the beginning. The scheme provides for the acquisition of the Salmon Leap mill and the construction of a dam about 300 feet farther up the river. The fall of the Salmon Leap, which is now 17 feet 2 inches, would thus be increased to about 40 feet. It is estimated that this would generate about 2,000 horsepower during six months of the year. At first it was proposed to install Diesel engines to supplement the turbines in the summer, but on account of growing prospective demands it was decided that it would be better to install turbines and generators, one of 1,000 brake horsepower and two of 500 brake horsepower each. It is believed a minimum of 1,800 horsepower could be generated 183 days in the year, 900 brake horsepower for 90 days, and 450 brake horsepower for 92 days. On this basis it is calculated there would be an annual saving of 16,464 tons of coal over the average of Irish electric generating stations working continuously. It is suggested that through co-operation between the railway and the Dublin Corporation the station could assist the corporation in the winter months when the generative power and the needs of the corporation for electricity would be at their maximum. In return the corporation would assist the railway company when the city's demands are less and the water power at its lowest point. The electrical power supplied by the Dublin Corporation varies from more than 6,000 kilowatts during the period from September to March to less than 4,000 kilowatts from April to September. The water power would increase and decrease over closely corresponding periods. It is stated that the railway company would require only about 200 horsepower of the total 2,000 to be generated, and that it could restore full care service (now curtailed) and reduce operation expenses. The corporation would be saved the outlay incidental to erecting an extra plant, which is needed, but could not at present be expected to be fully remunerative. If given government support, no difficulties regarding materials or labor are anticipated, and it is claimed that the work could be completed in six to nine months.

Gas Plant Declared Not a Nuisance.

Salt Lake City, Utah.—The Utah Gas & Coke Company may continue to operate its gas plant at its present location in the western part of Salt Lake, under a decision handed down by the state supreme court in the case brought by 59 plaintiffs against the company. The decision in that respect reversed the Third district court in granting a permanent injunction against the operation of the plant. Damages must be paid by the company, however, for the supreme court remanded the case to the district court with directions to allow the plaintiffs to amend their pleadings in the lower court if they so desire. The lower court will then proceed under direction to hear testimony and determine past and future damages under continued operation of the plant. Almost five years ago the 59 property owners in the immediate vicinity of the gas plant of the Utah Gas & Coke company instituted an action in the Third district court of the state in which they declared that the gas plant, which was operated in the vicinity of their homes, had become a nuisance and had made their homes unhealthful and unfit for enjoyment, and that the market value as also the rental value of the premises had been greatly depreciated. They asked the court to enjoin the operation of the works. The case was heard before judge T. D. Lewis in the Third district court and a judgment was rendered in favor of the 59 petitioners. The conclusion of judge Lewis was "that the operating of the gas plant and manufactory of the Utah Gas & Coke company on the premises occupied by it constitutes a permanent nuisance to the plaintiffs and to the premises of the plaintiffs against which they have no plain, nor speedy, nor adequate remedy at law and that plaintiffs are entitled to relief prayed for in the complaint." From this decision the company appealed. The supreme court through justice Gideon now hands down an opinion in which the findings of fact by the district court are affirmed. The conclusions of law and decree granting a restraining order against the operations of the gas company in the operation of their plant are reversed.

New Zealand Municipal Plant Very Profitable.

Wellington, New Zealand.—The annual report of the electric lighting department of the city for the fiscal year 1918 shows net profits of $141,707 on a total capital investment of $1,071,300, or a shade over 13 per cent, after deducting interest on loans, public and private lighting, depreciation, etc., which indicates that the department is in a very satisfactory condition. The report states that on March 31, 1918, there were 10,384 lighting connections, as compared with 9,454 the previous year; 4,878 heating connections, as compared with 4,003, and 378 power connections, as compared with 362—a total gain of 1,821 connections. During the year this department found it very difficult to procure the necessary supplies and materials to keep the electric plant up to date, and there is still a shortage of supplies.

FIRE AND POLICE

All Firemen Resign When Raise Is Refused.

Colorado Springs, Colo.—Resignations of every member of the fire department except the chief's have been accepted by the city council. The men, thirty-five in number, resigned because their request for increased wages was refused. A force has been engaged to fill all vacancies, Mayor C. E. Thomas said, including many students at Colorado college, who received their discharge from the students' army training corps.

Fire Captain Killed.

New York, N. Y.—Captain Joseph S. Fitzgerald, in command of fire engine company 207, Brooklyn, lost his life while fighting an early morning fire in a six-story loft building. Fitzgerald was at work on a ladder when he was weakened by the smoke, and, losing his balance, fell to the sidewalk. He died from the effects of a fracture of the skull while being taken to the hospital. The building in which the fire occurred was occupied by a number of manufacturing firms, and the property loss was estimated as $15,000.

Toronto Police Strike.

Toronto, Ont.—The Toronto police force went out on strike in protest against the dismissal by the police commissioners of thirteen members of the Police Union, which the commissioners had refused to recognize because of its affiliation with the Trades and Labor Council. Policemen who were officers of the union had been summarily dismissed by the commissioners after they declined to resign. Mayor Church and members of the city council made every effort to effect at least a temporary settlement so that the men would return to duty. Of five hundred policemen, about ninety remained on duty, these including inspectors and sergeants. This force was augmented by special constables and military police.

GOVERNMENT AND FINANCE

Citizens' Committee to Advise on Financial Troubles.

Columbus, O.—Council has adopted a resolution providing for the appointment of a citizens' advisory finance committee to advise with and assist council in solving the financial troubles of the city. Council points out in the resolution that the estimated expenses for next year, as determined and recommended by Mayor Karb amount to $1,802,896, and that the net revenue available will be $906,396. In speaking on the resolution, councilman Weinland, who introduced it, said a careful analysis of the financial condition of the city will show that it is not the result of extravagance and waste of public funds, but a failure, from year to year, to collect, in taxes, sufficient to meet the operating needs of the city. Mr. Weinland has also introduced a resolution declaring it necessary to authorize a million dollar bond issue to meet this and next year's operating deficiencies, and he proposed that this question be submitted to a vote of the people. In speaking on that resolution he pointed out that it would be an almost hopeless task to cut the city's expenses to meet its income, and suggested that to take steps to increase the city's income sufficient to meet its needs, would be a much more businesslike procedure. At that time, he said, if the offices of the mayor, auditor, city attorney, city clerk, civil service and others were wiped out entirely, it would not make a saving of more than $75,000 a year, which would be but a drop in the bucket. Substantial cuts, he said, would have to come from the big departments, such as the police and fire, and it would be necessary to wipe them out entirely to meet the shortage that now faces city officials. It would be foolish, Mr. Weinland said, to eliminate public service, such as garbage and refuse collection. The cost of this, per capita, to the city is but nominal, while the cost to the citizens by individual arrangements with private scavengers would be many times greater. According to the resolution, the committee is to consist of the president of the Columbus Philanthropic Council, the president of the Columbus Chamber of Commerce, the president of the North Side Improvement Association, the president of the South Side Civic Association, the president of the West Side Betterment Association, and the editors of the three daily papers. It will be the duty of the committee to confer and advise with the council and its finance committee in the preparation of the council appropriation ordinance for 1919, and on all other matters relating to the financial condition and policy of the city.

Tax Rate Objectors Win Fight.

Jersey City, N. J.—A divided vote of 5 to 5 by the Court of Errors and Appeals at Trenton leaves undisturbed the recent decision of the Supreme Court setting aside the tax rate of $1.73 per hundred fixed by Jersey City for December. Because of the divided vote there can be no opinion of the Court of Errors and Appeals and therefore the Supreme Court opinion written by Justice Parker becomes the last judicial effort upon the subject. The result of the decision will involve the financial affairs of Jersey City in various complications. The tax rate of $1.73 was fixed to cover the period intervening between the close of the old fiscal year and the beginning of the new year, now fixed by statute as January 1. The rate was contested as excessive and beyond the powers conferred on the city commission. In this view the Supreme Court concurred, the opinion by Justice Parker pointing out that under the plan pursued by the commissioners the taxpayers would be compelled to pay almost the equivalent of three years' taxes in twenty-five months. The gist of the Supreme Court opinion was that the tax for general purposes imposed for the month of December could not lawfully exceed one-twelfth of the tax for the preceding twelve months. The court announced several exceptions to this general declaration, these including the school tax and the Edge road tax.

City Employes Salaries Increased.

Wilmington, Del.—Without a dissenting vote city council has accepted the report of the finance committee recommending an increase in salary for the firemen, policemen and street hands, the firemen and police to get a $10 per month increase, while that of the street hands was fixed on a sliding scale basis. The recommendation calls for the increase of the men of the first two departments to be effective as of November 1, while the street hands' increased compensation dates as of November 24. The firemen had requested a $15 increase. The committee on finance has had under careful consideration for some time the petitions referred to it of the police and fire departments and the street hands for an increase of pay. All petitions were based on the abnormal high cost of all the necessaries of life. The committee procured information from a number of cities, of like size and conditions in this and other states, finding as a fact, it says, that the compensation of the class of employes submitting the request in the municipalities whence information was sought, is less than now being paid in this city. The committee was not, however, "influenced by this phase of the matter, realizing that determination of the expedience of the increase sought is not governable at this time by the value by fixed rule of the services rendered, but by the necessities of an exigent situation apparent to all—the inability to make a normal income cover the present cost of living." The committee continued: "The right to secure revenue for the city by taxation is controlled by a maximum fixed by the state, and the taxing power of the city has been already exercised as far as seems equitable. The committee has therefore been compelled to look toward a revision of the budget to procure the means of increasing wages rather than to securing any additional income. A communication was addressed consequently to the councilmen in charge of the several departments, inviting a study of their needs, in the light of five months of operation, with the view of

ascertaining in what manner and to what extent reductions were possible. Through their co-operation and that of employes in the departments, and to the further fact that the excessive cost of material has made it prudent to postpone certain improvements contemplated at the beginning of the fiscal year, your committee reports that, by decreasing a number of items in the present budget, an increase of pay can be given. The employes in the street department are graded into four classes, as follows: Skilled laborers, drivers, sweepers and stablemen, watchmen and officemen. Men of the first grade are to receive 40 cents an hour, those of the second grade receive 35 cents an hour, those of the third grade receive 30 cents an hour, and those of the fourth class, stablemen and officemen, at the rate of $3.50 per day, and watchmen at the rate of $2.75 per day. Except in the fourth class, eight hours to constitute a day. Only time made is to be paid for. Time and a half is to be paid for excess over eight hours, for night work, for Sundays, and for public holidays, when ordered to work. The report was supplemented so as to make any man after serving in the fire department for one year a full fledged fireman and entitled to the full pay as such.

To Tax Ticket Speculators.

New York, N. Y.—The board of aldermen, 58 to 5, has adopted an ordinance regulating ticket speculators, as recommended by the committee on general welfare, which held a number of public hearings on the measure. The ordinance provides that agencies selling theatrical tickets must pay $250 a year license and must not charge a purchaser more than fifty cents above the price stamped upon the theatre ticket at the box office.

TRAFFIC AND TRANSPORATION

Six-Cent Fares Granted in New York State.

Albany, N. Y.—The New York State Railways have been authorized by the up-state public service commission to charge a 6-cent fare in Utica and Syracuse. The new rates are to continue only during the war and while war conditions continue to exist. Application to reopen the proceeding may be made at any time after the signing of the treaty of peace. The New York State Railways asked for an increased rate of fare in Rochester, Syracuse, Utica, Rome, Oneida and Little Falls. Rochester procured a writ of prohibition under which the commission, in the Quinby case, was forbidden to consider the question of fare rates in Rochester. Syracuse withdrew its objections, claiming that the question of the effect of franchises was not before the commission and no proof as to franchises was given. Utica, by formal resolution of its Common Council, waived franchise restrictions during the continuance of the war. No evidence was given as to rates in Rome, Oneida or Little Falls. The commission retains jurisdiction of the company's petition for further investigation and determination of such questions as may arise in those cities should such action be desired. The New York State Railways operates four divisions—Rochester, Syracuse, Utica and Oneida. The commission said in part:

> It is axiomatic that these facilities cannot be provided unless the income produced by their operation is sufficient to pay the cost thereof. The cost includes not only the operating expenses, but also the interest which must be paid upon the money which was borrowed to produce the plant with which the service is rendered; and in that statement we do not take into consideration the right to an adequate rate of return on the invested capital, which has been so often stated by the courts. Our consideration of this case has led us to the conclusion that we are not concerned here with the fixing of a rate which will give any real return on invested capital, but merely to fix such rates as will permit this company to tide itself along and meet the extra demands made upon it through the abnormal increase in the cost of labor and material; which rates should be continued in effect until with the coming of peace and the return to normal operating conditions, the matter can be investigated and rates fixed which will be just, not only to the public but also to the company.

The commission says there cannot be any just claim made that the value of the property used in the public service by the company does not equal the amount of the interest-bearing debt. In fact, it exceeds it by a large margin. There is no probability that the increased revenue necessary will be realized from increased traffic. The gross revenue for 1917 was less than in 1916, and for the first four months in 1918 there was a considerable falling off in travel from the corresponding months in 1917. The increase in revenue necessary to enable the road to continue in operation must come from an increase in fares. The commission says:

> If one line in a city system should be shown to be operated at a profit and another line at a loss, that does not necessarily mean that the rate should be increased on one line and not on another. The unit fare for electric railway riding in cities has become so firmly fixed in practice that it would cause too violent a disruption to adjust rates in that manner, even though it should be considered theoretically just. The most workable plan will probably be to treat each municipal system as a whole and let the lines located in the more populous sections help to carry those which for the time may prove to be unprofitable. Neither is it feasible to fix the limits by the geographical boundaries of the different municipalities. It is common knowledge that the actual limits of a community are not bounded by its geographical lines and that in the case of all our cities there is adjacent territory, peopled for the most part by those doing business in the city and all forming a part of the one community. In such cases it may be fairly said that it is an impossibility in practical operation to separate the accounts to show accurately the revenues, expenses of operation or even the investment in property used in the service.

Municipal Car Line Nears Completion.

St. Louis, Mo.—Director of public utilities Hooke has announced that the municipal railway across the free bridge would be in operation by about Feb. 1. Two one-man cars, each having a seating capacity of thirty-four persons, will be used in making the run from Seventh and Gratiot streets, St. Louis, to East St. Louis and back. The fare will be 5 cents.

City Wins in Fare Case.

Kansas City, Mo.—Three federal judges have refused to grant the request of the Kansas City (Mo.) Railway for an injunction to restrain state and municipal bodies from interfering with the company in complying with the War Labor Board's findings with reference to wages and fares. The company sought to put into effect an 8-cent fare with two tickets for 15 cents. Its contention was that on the strength of the award of the War Labor Board in the wage case, in which higher fares were recommended for the company, it ought to be permitted to put an increase in fares in effect without local interference. To prevent legal interference from public authorities the company sought, before installing the new fare schedules, to obtain an injunction from the Federal Court. The decision said:

> But what is the meaning and effect of the award of the National War Labor Board? Does it threaten the immediate confiscation, or any confiscation, of the property or revenues of the railways company? That award does not order the payment of wages it prescribes, either now or at any specific time in the future. Not only this, but it clearly shows that it was not the intention of the board that the railways company should be required or expected to pay them, or any of them, until, first, a lawful increase of the rate of fare it might charge had been granted by the proper tribunals, and until, second, the financial ability of the company, which it expressly found was not then such as to permit it to pay them, should become such as to permit it, in the words of the board, "to meet the requirements of the award."
>
> These were and are conditions precedent to the taking effect of the award, and until these conditions are fulfilled, the award does not make, but expressly negatives, any requirement of the increase of wages specified therein. If these conditions should at some future time, during the continuance of the war, be complied with, then, but not until then, will any requirement of payment of the increase of wages specified in the award arise. As the precedent conditions, on a compliance with which, only, the award can take effect, have not been complied with, and the railways company is not and will not be required to pay the increased wages until they are fulfilled, there is no immediate threat of confiscation by such payment or requirement of payment, and this court is not now required to issue its injunction to prevent such confiscation.
>
> But it is contended that the power is granted and the duty is imposed upon this court to compel the fulfillment of the conditions of the effectiveness of the award, to enjoin any interference with the increase of the rates of fare and the improvement of the financial ability of the railways company, although no confiscation is imminent. But the primary jurisdiction to increase and regulate the intrastate rates of fare of this company (and most of its passengers are intrastate passengers) is conferred and the duty to exercise this power is imposed upon the state boards, and proceedings are pending therein to effect a compliance with the conditions precedent to the effectiveness of the award. In this state of the case, and in the absence of any violation or threat of a violation of any provision of the Constitution or laws of the United States, it is not the province or duty of this court to increase the rates of fare requisite to put the award of the War Labor Board into effect, and the application for temporary injunction must be denied.

LEGAL NOTES

A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

City Regulation of Oils—Unreasonable Requirements.

(Ala.) A city has no power to absolutely prohibit the use of gasoline, benzine, and naphtha, but merely to regulate and control the sale, use, and disposition thereof.—Standard Oil Co. v. City of Birmingham, 79 So. 489.

(Ala.) An ordinance providing for the inspection of gasoline, benzines, naphthas, and requiring the specific gravity thereof at 60 degrees Fahrenheit to be between 58 and 84, is void for uncertainty, and because unreasonable and impossible of performance; the specific gravity of heaviest substance known being only 22.5.—Id.

(Ala.) An ordinance that "gasolines, benzines, and naphthas shall have a specific gravity at 60 degrees Fahrenheit of not less than 58 or more than 84," being clearly expressed and unambiguous, will not be construed as if the word "specific" was omitted, and the words "degrees Baume" added at the end, or as though there was decimal point before the 58 and 84, although, being unreasonable and incapable of performance as it stands, it would, by such construction, be made reasonable and capable of enforcement.—Id.

City Dump—"Public Nuisance"—Rights and Remedies.

(Ala.) A "public nuisance" is one which damages all persons who come within the sphere of its operation, though it may vary in its effects on individuals.—City of Selma v. Jones, 79 So. 476.

Generally a public nuisance gives no right of action to any individual, but must be abated by process instituted in the name of the state, under Code 1907, §§5193-5196.—Id.

A city dump, part of the sanitary system of the city, may be a private nuisance as to adjacent property owners, whose damages are different from those of the public.—Id.

A "nuisance" is anything that works hurt, inconvenience, or damage to another; and the fact that the act may otherwise be lawful does not keep it from being a nuisance, but the inconvenience complained of must not be fanciful.—Id.

A "private nuisance" is one limited in its injurious effects to one or a few individuals.—Id.

The fact that a city is given authority by law to establish and maintain a sanitary system for the community, and that a dump pile is a part thereof, does not prevent the placing and maintaining of the dump from constituting a private nuisance.—Id.

Liability for Water Rent—Preferred Claim.

(Ohio). Gen. Code, § 3958, relating to liability for water rent, authorizes a city to assess a water rent on tenements supplied with water, but does not make the claim therefor a preferred one against the receiver.—City of Cincinnati v. Schultz, 120 N. E. 176.

City Liability for Damages—Recovery.

(Conn.) In action against city and telegraph company for injuries from pole lying in gutter, direction of verdict for company because action was barred by limitations does not preclude city, on recovery of judgment against it, from suing company for indemnity; plaintiff's cause of action against city being different from city's right of action aganst company.—McEvoy v. City of Waterbury, 104 A. 164.

Where, in action against city and telegraph company for injuries from falling over telegraph pole lying in gutter, judgment is against city alone because the action against the company is barred by limitations, the barring of plaintiff's action against the company does not bar city's action over against the company, city's right of action over not accruing until final judgment is rendered against it.—Id.

Unlawful-City-County Agreement—Taxpayers' Action.

(Cal.) A taxpayer may maintain an action to restrain a city from carrying out an ultra vires contract between the city and county, wherein the county unlawfully agreed to furnish cement to the city.—Riverside Portland Cement Co. v. City of Los Angeles, 174 P. 31.

Refunding of Wrong Taxes.

(Fla.) Municipal authorities have a general right to refund to individuals any sums paid by them as corporate taxes which are found to have been wrongfully exacted, or for any reason to be inequitable.—Charles Blum Co. v. Town of Hastings, 79 So. 442.

Under its implied powers a municipality may and should return money received for a privilege which the person who paid it is prevented from enjoying by operation of law through no fault of his own.—Id.

City Regulation of Milk—Validity.

(Md.) Under Baltimore City Charter (Acts 1898, c. 123) the mayor and city council had authority to pass Ordinance No. 262 of 1917, regulating the production and distribution of milk and milk products in the interests of cleanliness and health.—Creaghan v. City of Baltimore, 104 A. 180.

Ordinance No. 262 of 1917 of city of Baltimore, regulating the production and distribution of milk, held not invalid.—Id.

Such ordinance is not invalid as attempting to confer on the commissioner of health unlimited discretion in granting, refusing, and revoking permits to and of milk dealers.—Id.

Regulation of Saccharin in Soda—Validity.

(N. Y. Sup.) Since saccharin is not injurious to health, its use in food products may be regulated, but cannot be prohibited, under the exercise of the police power.—People v. Excelsior Bottling Works, 171 N. Y. S. 733.

The use of one one-hundredth of 1 per cent. of saccharin in bottled strawberry soda labeled "sweetened with sugar and one one-hundredth of one per cent. of saccharin (benzo-sulphinide)," came within the proviso of Sanitary Code of City of New York, § 68, relating to a mixture of compounds known by their own distinctive name.—Id.

Rights of Telegraph Companies on Highways—Regulation by State.

(N. Y.) Special franchises granted by the state to a telegraph company to construct its lines in streets and highways, being broader than additional or supplementary franchises subsequently granted to the company by Congress, could coexist with the federal franchises.—People ex rel. Postal Telegraph-Cable Co. v. State Board of Tax Commissioners, 120 N. E. 192, 224 N. Y. 167.

A telegraph company, which accepted the federal Post Roads Act of 1866, and for years occupied streets constituting post roads, presumably not as a trespasser, but under some consent by proper local authorities, obtained rights in the nature of a "special franchise."—Id.

The only limitation on the power of a state or municipality to impose conditions on right of telegraph company, under federal Post Roads Act, to occupy streets to and of which the state or city has title and control, is that they shall not be arbitrary or unreasonable.—Id.

The right of a telegraph company, under the federal Post Roads Act, to enter upon exclusive occupation of streets and highways, was subject to reasonable regulation by the state.—Id.

Where a telegraph company seeks to appropriate parts of highways to an exclusive use, under the federal Post Roads Act, it is within the power of the state to exact compensation.—Id.

The federal Post Roads Act is permissive, and privilege granted to telegraph companies to construct lines in post roads and to operate them does not carry unrestricted right to appropriate public property of state, being like any other franchise, subordinate to public as to private rights.

NEWS OF THE SOCIETIES

Dec. 27-Jan. 2.—AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. Annual convention. Boston and Cambridge, Mass. Secretary's office, Smithsonian Institute, Washington, D. C.

Jan. 13.—AMERICAN INSTITUTE OF CONSULTING ENGINEERS. Annual meeting, New York City. Deputy secretary, B. Etchelle, 35 Nassau St., New York City.

Feb. 18-21, 1919.—AMERICAN ROAD BUILDERS' ASSOCIATION. Sixteenth annual convention and Ninth American Good Roads Congress under the auspices of the A. R. B. A., Hotel McAlpin, New York, N. Y. Secretary, E. L. Powers, 150 Nassau street, New York, N. Y.

Nov. 12-14, 1919.—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, New Orleans, La. Secretary, Charles C. Brown, Bloomington, Ill.

Joint Highway Congress.

Almost 1,500 men interested in highway development, including engineers, officials, boosters, contractors and material and equipment men, attended the sessions of the Joint Highway Congress in Chicago Dec. 9-13. The congress was under the auspices of the American Association of State Highway Officials and the Highway Industries Association. Several other organizations interested in the subject met at the same time, including the National Paving Brick Manufacturers' Association, the National Crushed Stone Association, the Concrete Mixer Association, the National Association of Road Machinery Manufacturers, the National Association of Sand and Gravel Producers, the United Accessory Manufacturers, the County Commissioners' Association of Illinois and the Cook County (Illinois) Commissioners' Association. In general, the program of the main meetings as printed in Municipal Journal was adhered to closely.

The joint meeting of the two organizations was held Wednesday morning. Gov. Frank O. Lowden, in opening the session, urged his hearers to "keep the good roads idea sold like good salesmen." He declared that officials with power of appointment must keep out incompetents, that engineers must recognize their heavy responsibility to build the roads as economically as private companies would and that material men must be satisfied with a fair profit.

James I. Blakeslee, fourth assistant postmaster general, presented a vigorous plea for good roads to help reduce the soaring high cost of living. Motor postal routes will aid materially, in his estimation. He said: "The establishment of vehicle truck routes would eliminate wasted food which cannot get to market, employ labor in essential occupations, utilize a modern mechanical device, encourage the construction and improvement of highways, let the producer produce, the consumer consume and the conveyor convey."

Mr. Blakeslee's suggestion for three different methods of meeting the cost of construction and improvement of highways are as follows: First, for a highway entirely Federal or national in character—for which the Federal Government should defray the cost of construction, improvement and maintenance—an interstate highway available not only for the transportation of merchandise and food products, but also useful for military purposes. He proposes a system of 15,000 miles, costing about $30,000 per mile, which could be paid for in a reasonable time from the earnings of the service performed upon it. Second, for a highway supported by the Federal Government and the state local subdivision. Third, for a highway, supported by the state, county or township, which would include the construction and maintenance of dirt, gravel or sand clay roads which should be paid for solely by the local state, county or township, and would be utilized as feeder roads and finally connect with the national trunk roads.

Roy D. Chapin, formerly chairman of the Highway Transport Committee, spoke on "The Present and Future of Highway Transport in America." He urged greater development and encouragement of highway transportation. He said: "There must be regulation of highways transport. Its full development is dependent, partly, on the elimination of irresponsible operators, the stabilizing of rates, the working out of uniform bills of lading, and methods of insuring loads. Analysis must be made of the desirability of exclusive franchises to operate over certain highways. It is the present thought of our committee that such franchises are not conducive to the best interests of the people. Provided rates for traffic are properly stabilized, competition over the highways would seem far better for the shippers, and only in this way will rates finally come down."

In this period of readjustment, Mr. Chapin believes there should be in Washington a comprehensive organization, not only for the administration of Federal road funds, but also for the exhaustive study of the possible growth of highway traffic during the next decade, from which resultant recommendations should be made to all the highway authorities of the country as to the type of roads that should be built to handle this traffic successfully.

"A Suggested National Highway Policy and Plan," was presented in a paper by E. J. Mehren, editor of Engineering News-Record.

A. R. Hirst of Wisconsin read an important paper on "The Underlying Principles Controlling the Laying Out, Marking and Maintaining of a State Highway System."

George M. Graham, chairman of the Motor-Truck Committee of the National Automobile Chamber of Commerce said that the highways should be the servant of transportation, not its master. Against his proposed truck

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PROBLEMS CITIES ARE STUDYING WITH EXPERTS

Plans are being prepared for the construction of a BRIDGE in Tionesta, Pa. The consulting engineers are the Farris Engineering Co.

Colfax, Ia., plans the construction of a BRIDGE. The Marsh Engineering Co., consulting engineers, are preparing the plans.

The village of Grosse Pointe Park, Mich., is to build SEWERAGE IMPROVEMENTS according to plans prepared by the consulting engineer, T. M. Campau.

An ELECTRIC LIGHT PLANT is to be built by the City of Marshall, Mo., according to plans now being prepared by the engineering firm of Henrici, Kent & Lowry.

An extension of the SEWERAGE SYSTEM is planned in Ford, Mich., to cost $149,500. The plans were prepared by the consulting engineering firm of M. L. Brown & Son.

A SURVEY of the public and private CHARITABLE INSTITUTIONS of Newark, N. J., is to be made for the city commissioners by the Russell Sage Foundation.

River Falls, Wis., is contemplating PAVING IMPROVEMENTS according to plans prepared by the consulting engineer, L. P. Wolfe.

Tilton, Ill., will soon receive bids for PAVING IMPROVEMENTS. The plans were prepared by W. S. Dillon, consulting engineer.

A BRIDGE is to be built by the City of Conshohocken, Pa., over the Schuylkill river, to cost about $175,000. The consulting engineer is B. H. Davis.

Florence, Wis., is to build WATERWORKS IMPROVEMENTS, including elevated tank, pump and motors, according to plans prepared by the consulting engineer, W. G. Kirchoffer.

An ELECTRIC PLANT and WATERWORKS IMPROVEMENTS are being planned by the city of Florence, Ariz. The consulting engineers are the firm of Burns & McDonnell.

WATERWORKS IMPROVEMENTS are to be made by the city of Wooster, O., to cost $150,000, according to plans prepared by the consulting engineering firm of W. J. Sherman Co.

INDUSTRIAL NEWS

Cast Iron Pipe and Steel.—The rather dramatic refusal of the War Industries Board to listen to the new schedule of prices proposed by Judge Gary, representing the producers, at the recent meeting in Washington emphasizes the prospect of a free market on January 1. The War Industries Board passes out of existence and the committee of the American Iron and Steel Institute ceases its work. While there are therefore no official prices, it is understood that the United States Steel Corporation and most of the independent producers will hold to the suggested schedule. This calls for a $3 reduction on pig iron and it is expected that cast iron pipe will be subject to a similar reduction. Meanwhile the Government prices hold as follows: Chicago, 4-inch, $69.80; 6-inch and larger, $66.80; Class A, $1 extra. New York: 4-inch, $70.70; 6-inch and larger, $67.70; Class A, $1 extra.

Positions for Army Officers Now Leaving Camps in U. S.

The United States Employment Service has issued an appeal to employers in need of technical and other highly trained men to take on qualified men from the commissioned and enlisted ranks of the army who are now leaving the camps.

Hundreds of officers, many of the higher ranks, are asking the camp representative and federal directors of the Federal Employment Service for the States to assist them to obtaining new employment. There also are large numbers of enlisted men qualified for professional and technical positions who are leaving the army without having positions in sight.

Among the men of this high type applying at the Federal Employment Service are engineers and other technical men, executives, chemists, statisticians, purchasing agents, employment managers, cost accountants, etc.

All employers wishing to get in touch with these men should communicate with the Professional Section, United States Employment Service, Department of Labor, Washington, D. C.

Highway Industries Association.

The annual meeting of the Highway Industries Association was held in connection with the Joint Highway Congress in Chicago. The resolution of the Highway Congress in favor of increased Federal-aid funds, a national highway commission and a national highway system was indorsed. The meeting authorized the president of the association to appoint a finance committee and a membership and organization committee.

In conformity with the constitutional provision that additional directorships be established for each 50 members in the organization, the president declared a new directorship created, the association now having 67 members. David S. Ludlum, president of the Autocar Co., was elected to this directorship.

The following directors were re-elected: W. P. Blair, representing the National Paving Brick Manufacturers' Association; A. T. Rhodes, representing the Granite Paving Block Manufacturers' Association; E. J. Morrison, representing the National Association of Asphalt Block Manufacturers; W. T. White, representing the National Automobile Chamber of Commerce.

Officers of the ensuing year were elected as follows: President, S. M. Williams, sales manager, Garford Motor Truck Co., first vice-president, George P. Coleman, state highway commissioner of Virginia; second vice-president, E. J. Mehren, editor, "Engineering News-Record;" third vice-president, Charles J. Lang, of Cleveland, O.; secretary and treasurer, Henry G. Shirley.

NEWS OF THE SOCIETIES

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regulation law for a 14-ton limit, 800-lb. per inch width of tire, respective speeds of 30, 20 and 15 miles per hour over country, suburban and city pavements, were arguments by several engineers indicating that the values were too high.

A. D. Williams, chairman of the State Road Commission of West Virginia, combining his own remarks with a written discussion sent in by F. H. Zouck, chairman of the Maryland State Roads Commission, said: "If we are to face in the next three years as much change in loading and rate of speed upon the public road as we have experienced in the past three years, but very few miles of the present improved roads of this country will be found remaining intact, and with that thought standing boldly before us it is the duty of every person interested in the highway movement to stop, look, listen, pause and consider before venturing further, because if we do not there is bound to come a reaction of public sentiment that may parallel that of the old canal days.

"The truck cannot be made to compete with the railroad as an economical proposition. The experience during the past war emergency cannot be made a criterion for future action, except to direct our attention to the danger of over-loading the highways. The truck has its place as a feeder to the railroad and as a medium between the farm and the market, but the load limit should be not over 600 lb. per inch width of tire for brick, concrete and asphaltic roads, and not over 400 lb. for the average waterbound macadam road. The load upon earth roads must be governed by the weather and the soil conditions. I would not advocate embargoes, but a loading to correspond with the conditions of the highway.

"I agree with Mr. Graham that when a road is constructed and a few individuals use that road for profit they should bear the cost of maintenance: but if the truck manufacturers insist on increasing the loading over 600 lbs. per inch width of tire and advocate heavy-tonnage vehicles, no type of road now in existence will endure sufficient tonnage to be satisfactory in license cost to the truck operator."

C. J. Bennett, state highway commissioner of Connecticut, defined the position of the highway engineer with reference to trucks as follows: "An attempt to exceed a reasonable weight in motor trucks would do two things: First, make it necessary to replace a large amount of mileage already constructed with expensive construction; and, second, on that account reduce the expansion of the highway systems—for, under present conditions, there is a definite limit to the amount of money which states can appropriate for highway construction.

"My suggestion, therefore, is that the motor-truck interests modify their demand for roads which will stand unreasonable weights, and place their attention upon the development of a maximum standard motor truck which will be reasonable in its weight, the speed at which it can be operated and its width and height."

Connecticut's law, framed before the war, in 1917, represents Mr. Bennett's idea of a liberal regulation. It calls for a 12½-ton total load, 700 lb. per inch of tire width, 9½ ft. total width and a maximum speed of 25 miles per hour.

The Congress finally adopted the following resolution:

WHEREAS, the President of the United States in his recent message to the Congress recognized the value of improved highways in the general transportation system of the nation and definitely recommended and urged their rapid development; and

WHEREAS, this work is necessary to give employment to our returning soldiers and also to furnish worthy projects on which unemployed labor can be engaged during the period of readjustment; and

WHEREAS, we recognize the necessity for a well-defined and connected system of improved highways in order to expedite the distribution of large volumes of foodstuffs now wasted on account of the lack of prompt and adequate highway transportation and to better serve the economic and military needs of the nation; therefore

BE IT RESOLVED: That a federal highways commission be created to promote and guide this powerful economic development of both highways and highways traffic and establish a national highways system.

BE IT FURTHER RESOLVED: That the present appropriations for the federal aid to the states be continued and increased and the states urged to undertake extensive highway construction so as to keep pace with the development of this country and its transportation needs, and that in carrying out the provisions of the present Federal Aid Act, or any amendment thereto, the state highway departments shall co-operate with the federal highways commission.

BE IT FURTHER RESOLVED: That all governmental activities with respect to highways be administered by the federal highways commission.

The Resolution Committee which presented the report consisted of: Paul D. Sargent, chief engineer of the Maine state highway commission; Windsor

T. White, president of the White Company; George C. Diehl, of the American Automobile Association; George E. Johnson, state engineer of Nebraska; W. O. Rutherford, general sales manager of the B. F. Goodrich Co.; J. M. Lowe, president, National Old Trails Road Association; W. G. Thompson, state highway engineer of New Jersey; A. N. Johnson, chief engineer, Portland Cement Association; John Craft, of the Alabama state highways commission; Wm. E. Metzger, president of the Detroit Automobile Club; A. R. Hirst, state highway engineer of Wisconsin; W. P. Blair, secretary, National Paving Brick Manufacturers Association; J. D. Clarkson, general manager, Jefferson Highway Association; A. H. Blanchard, president, National Highway Traffic Association; H. S. Quine, Goodyear Tire & Rubber Co.; Ira R. Browning, state road engineer of Utah; A. P. Sandles, secretary, National Crushed Stone Association; George P. Coleman, state highway commissioner of Virginia; S. F. Beatty, National Association of Road Machinery Manufacturers; H. O. Cooley, of Aberdeen, S. D.; C. F. Adams, of Chillicothe, Mo.; C. H. Houston, of Chattanooga, Tenn., and W. A. Alsdorf, Columbus, O.

American Waterworks Association, New York Section.

The December meeting of the New York section of the American Waterworks Association was held on Friday, December 20, in the green room of the Hotel McAlpin. About seventy-five were present.

Following the luncheon, a paper was read by D. W. French, superintendent of the Hackensack Water Company, describing the practice of that company in connection with metering and meter maintenance. In purchasing meters, that company requires the manufacturer to furnish a record of test of each meter showing that it is accurate within one per cent. When any meter is frozen in use, it is removed and tested and is examined carefully for damage done. Even though special bottoms or other appliances are provided for limiting the damage done by freezing, it is sometimes found that disc chambers or other parts have been cracked and need repair. The meters are set and owned by the company and kept in repair by them, except that the user must pay for any repairs made necessary by misuse or freezing. Very few of the meters are set out of doors.

The company has in service about 45,000 meters. These are read quarterly, except that those recording more than 25,000 gallons a month are read monthly. Each meter reader averages about 175 meters a day. He starts out each morning with 200 cards in order to allow for inability to obtain entrance to certain premises. Formerly the company's rule was to remove and test a half-inch meter when it had recorded 100,000 cubic feet and larger meters for proportionately greater amounts. The New Jersey Public Service Commission, however, now requires that each meter be read after either ten years' service or recording 750,000 cubic feet. About 74 per cent of the water pumped yields a revenue, the remaining 26 per cent being water used for fire or other purposes that are not revenue producing, leakage in mains and other unaccounted-for water. Part of this unaccounted-for water is due to slip in the meter. Probably the meters, averaging all in service, under-register about five or six per cent. Check valves are placed on many of the services inside the meter, which prevent hot water being forced back into the meter; the draining of the house service if the street main should be cut out temporarily for any purpose, and other advantages are believed to attach to the use of check valves.

Following this a paper was read by William R. Edwards, assistant superintendent of the Passaic Water Company, describing chiefly the practice of that company in determining the size of meter for any given service. Most of the towns served by this company are almost entirely metered, one or two of them being 100 per cent. metered. This company believes in small meters, using ⅝-inch meters for all residences and apartment houses up to six families. The pressure in mains runs fairly high, averaging perhaps 70 or 75 pounds. Mr. Edwards referred to the paper recently read before the New England Waterworks Association by Caleb Mills Saville and printed in the December 7 issue of Municipal Journal. He agreed with Mr. Saville that larger service pipes were needed in many cases, and that these would do more toward preventing loss of head in the house services than increasing the size of meter.

Following this the members present divided into three squads, one of which visited each of three meter companies, the National, Neptune, and Thompson, whose factories are located in New York and which had kindly offered the active members an opportunity to inspect their plants under the guidance of representatives of the several companies.

American Road Builders' Association.

At the invitation of Mayor Hylan, the Merchants' Association and other civic organizations, the American Road Builders' Association has decided to hold its sixteenth annual convention in New York City. This is the first time in the long history of the organiaztion that an annual convention has been held in that city, and every effort is being made to make the meeting an event in keeping with the municipality in which it is to be held.

The executive committee, in which the active direction of the association's activities is vested, has chosen the Hotel McAlpin for headquarters. The convention will begin on Tuesday, February 25, and end on Friday, February 28. The program, which is being prepared, will include technical sessions every forenoon and afternoon, a dinner on one evening, and exhibition by material and machinery dealers and manufacturers, and a number of entertainments. The exhibition will be held in the roof garden and will comprise displays of models, photographs, sample of materials, and the like. The exhibition of heavy machinery was omitted for patriotic reasons this year, the officials feeling that despite the practical value of such display they were not justified in asking manufacturers and dealers to get together and ship the extensive displays they were in the habit of making. In place of the usual show there was a large and interesting exhibition composed chiefly of photographs, models, literature and the like. As already noted, the same plan is to be followed this year.

Society of Automotive Engineers.

The Society of Automotive Engineers will hold its winter meeting in New York, Jan. 12-14, 1919. The technical sessions will be devoted to war and post-war subjects, such as post-war automobiles, thermodynamics of internal-combustion engines, road tractors and commercial motor trucks.

Engineers' Mission to France.

At the invitation of the Société des Ingénieurs Civils and a committee of the French Engineers' Congress, and with the official approval of the French government, a delegation of American engineers has been sent to France to study with the French engineers certain problems involved in the industrial rehabilitation of France after the war.

This delegation was invited to go to Paris to examine in joint conference questions of the utilization of commercial ports, the development of navigable waterways, the development of water power and the improvement of road systems. Although these were the only subjects mentioned specifically, the congress will probably take up many other questions of development in which all engineers are directly interested.

The invitation was sent to the American Society of Civil Engineers and was accepted at once by cable, the acceptance stating that such a delegation would be organized in cooperation with the other American national societies.

The following delegates were appointed:

American Society of Civil Engineers—J. F. Case, chairman; George W. Tillson, George W. Fuller, A. M. Hunt, Nelson P. Lewis and George F. Swain.

American Society of Mechanical Engineers—Charles T. Main, president.

American Institute of Electrical Engineers—Lewis B. Stillwell.

American Institute of Mining Engineers—E. Gybbon Spilsbury.

ADVANCE CONTRACT NEWS

ADVANCE INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested t o send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
			STREETS AND ROADS.	
Minn.,	Cass Lake	noon, Dec. 27	Construction of highway	Ray Phelp., Twp. Clk.
Ark.,	New Port	4 p.m., Dec. 28	Road improvement	J. A. Lindley, Secy., Rd. Impt. Dist., Jackson Co.
Kan.,	Great Bend	Dec. 28	Building 27.5 mi. monolithic brick road, 20 ft. wide, also grading road bed, work to cost about $852,000	W. J. Armstrong, Co. Engr.
Ind.,	South Bend	10 a.m., Dec. 30	Construction of a concrete road in Union Twp	Arthur F. Wolf, Auditor.
Ind.,	Lakeville	Dec. 30	Improvement of road by surfacing with concrete	County Comrs.
N. Y.,	New York	2 p.m., Dec. 30	Repaving, where directed, the cement walks of small parks in the Borough of Manhattan	Philip Berolsheimer, Comr. of Parks.
N. Y.,	S. I., St. George	noon, Dec. 31	Furnishing one bituminous distributor	Calvin D. Van Name, Pres., Borough of Richmond.
Minn.,	Carlton	10 a.m., Dec. 31	Hauling gravel on state road	Aug. R. Norman, Co. Aud.
Ala.,	Moulton	Jan. 1	Grading, draining and surfacing with chert or gravel, 7.38 mi. of road, involving 26,331 cu. yds. excavation, 13,300 cu. yds. surfacing, 278 cu. yds. concrete and 525 lin. ft. vitrified pipe	Co. Comrs.
O.,	Osnaburg	10 a.m., Jan. 3	Grading hill in Osnaburg Twp	W. C. Schick, Twp. Clk.
Pa.,	Johnstown	noon, Jan. 4	Approximately 36,700 cu. yds. excavation and 19,960 cu. yds. of fill on road in Upper Yoder Twp	L. R. Owen, Twp. Engr., Otto Bldg.
Miss.,	Greenwood	Jan. 6	Furnishing gravel for resurfacing public highways; furnishing one auto truck and one or more trailers for use on public highways	Eli Abbot, Engr.
Ind.,	Decatur	10 a.m., Jan. 6	Constructing two macadam roads in Washington and Wabash Townships	John Mosure, Co. Aud.
Okla.,	Tulsa	2 p.m., Jan. 6	Construction of 33 mi. of roads to be graded and brought to the established grade	County Engr.
Ind.,	Rensselaer	2 p.m., Jan. 6	Construction of a gravel road in Union Twp	Jos. P. Hammond, County Aud.
Wash.,	Seattle	10 a.m., Jan. 6	Construction of road in King County	N. W. Wardall, Clk., Bd. of Co. Comrs.
Ind.,	Paoli	2 p.m., Jan. 6	Construction of road in Paoli Twp	P. M. Stephenson, Co. Aud.
Ind.,	Delphi	1.30 p.m., Jan. 7	Construction of a gravel road	H. D. Good, Co. Aud.
Ind.,	Wabash	10 a.m., Jan. 7	Construction of gravel road in Waltz Twp. and a stone or gravel road in Liberty Twp	Frank P. Kircher, Co. Aud.
Ind.,	Corydon	2 p.m., Jan. 7	Construction of stone road in Washington Twp	Sam C. Mauck, County Aud.
Ind.,	Martinsville	2 p.m., Jan. 7	Construction of a brick road in Washington Twp	Sam Watson, County Aud.
Cal.,	Stockton	10 a m., Jan. 7	Improvement work on county road	Eugene D. Graham, Clk., Bd. of Superv.
S. D.,	Deadwood	10 a.m., Jan. 9	Construction of 1.75 mi. road, involving 4,000 cu. yds. solid rock excavation, 7,000 cu. yds. loose rock excavation and 4,000 cu. yds. earth excavation	Fred Harris, Co. Aud.
Wash.,	Seattle	10 a.m., Jan. 13	Construction of road trestle	Norman M. Wardall, Clk., Bd. of Co. Comrs.
Ind.,	Indianapolis	10 a.m., Jan. 15	Construction of a gravel road on township line between Washington, Wayne and Pike Twps	Leo K. Fesler, Co. Aud.
Ark.,	Blytheville	Jan. 15	Paving 2 mi. road, 20-50 ft. wide, involving 38,500 sq. yd. 6-10-in. concrete; also curbing, guttering and storm sewering same, involving 42,600 lin. ft. concrete curbing, 25,580 sq. yd. concrete guttering and 1,600 lin. ft. 15-18-in. vitrified pipe sewering	Pride & Fairley, Engrs.
Ill.,	Mt. Carmel	Mar. 1	Paving city street	G. C. Harvey, Engr.
			SEWERAGE.	
N. Y.,	Syracuse	1.30 p.m., Dec. 30	Construction of sewer	R. D. Roney, Dept. of Contr. & Supply, Syracuse.
Ark.,	Morrilton	10 a.m., Dec. 30	Construction of a sewer system, consisting of 15,900 lin. ft. vitrified pipe, 51 manholes, reinforced concrete septic tank, etc.	Harrington, Howard & Ash, Kansas City, Mo.
O.,	Cincinnati	noon, Dec. 30	Sewerage improvements in several streets	Chief Engr., Dept. of Public Service.
Mass.,	Boston	noon, Dec. 30	Sewerage work	Thos. H. Sullivan, Comr. of Pub. Wks., 511 City Hall Annex.
N. J.	Keansburg	8 p.m., Jan. 2	Laying drain pipe in city street	Walter A. Conroy, Boro. Clk.
Ariz.,	Globe	noon, Jan. 9	Construction of sanitary sewers and a sewage disposal plant, involving approximately 18 mi. of sewer lines from 6 to 18 in., 280 manholes, 12 drop manholes, 22 flush tanks and 76 lampholes, 2 reverse flow Imhoff tanks, 2 sludge beds and chlorinator house with necessary excavation	Benham Engrg. Co., Colcord Bldg., Oklahoma City, Okla.
Ark.,	Blytheville	2 p.m., Jan. 15	Furnishing 1,600 lin. ft. 15 to 18-in. vitrified pipe storm sewer	Pride & Fairley, Engrs.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO

WATER SUPPLY.

Ill.,	Joliet	2 p.m., Dec. 30.	Purchase of two 3,000,000-gal. steam pumps, two 150 high power boilers, one 150-ft. 36-in. steel stack	Mayor.
Mich.,	Wyandotte	Dec. 30.	Building filter plant with 6,000,000 gal. daily capacity; brick and steel filter house and head house; two coagulation basins; filtered water reservoir having usual equipment of hydraulic valves and controllers; furnishing and laying 1,450 ft. of submerged intake pipe and elbows, equipped with flanges and joints; dredging and backfilling; removal of existing elbow, relocating of existing crib; brick addition to pumping station, etc.	R. W. Pratt, Cleveland, O.
N. Y.,	Cohoes	Dec. 31.	Building additional pumping unit	H. W. Taylor, Cons. Engr.
Miss.,	Inverness	Jan. 2.	Improving waterworks system and electric light plant, including cast iron and galvanized pipe, valves, hydrants, oil engines, pumps, reservoirs, etc	N. A. Kramer, Engr., Magnolia, Miss.
Ill.,	Galesburg	5 p.m., Jan. 2.	Construction of a deep well pumping unit	F. M. Connolly, City Engr.
Pa.,	Oil City	Jan. 5.	Furnishing cast iron water pipe, from 4 to 24-in. inclusive; flanged cast iron pipe; special valves, fire hydrants, water meters, stop cocks, etc	A. M. Breckenridge, City Clk.
Minn.,	Hallock	2 p.m., Jan. 7.	Construction of steel water tank	Earl D. Jackson, Cons. Engr., St. Paul, Minn.
Tex.,	Houston	noon, Jan. 10.	Drilling of seven wells, with deep well centrifugal pumps, motors, etc., at the central water plant	E. E. Sands, City Engr.
Okla.,	Poteau	8 p.m., Jan. 31.	Installation of a complete water system and filter plant, consisting of one brick pumping station, one brick filter house, one sedimentation basin, one pure water reservoir, two 100-H.P. boilers, two high-service pumping engines, three steam engine or turbine-driven centrifugal pumping units, two duplex boiler feed pumps, one condenser and air pump, steam and water piping, filter equipment for two tanks, one concrete overfall dam, 3½ mi. cast-iron pipe, valves and hydrants	A. W. Lindsey, City Clk.

LIGHTING AND POWER.

D. C.,	Washington	Dec. 30.	Constructing two radial block chimneys (Spec. No. 3712)	Bureau of Yards and Docks, Navy Dept., Washington, D. C.
N. Y.,	New York	Dec. 30.	Extension to power plant (Spect. No. 3632)	Bureau of Yards and Docks, Navy Dept., Washington, D. C.
N. Y.,	New York	11 a.m., Dec. 31.	Furnishing incandescent electric lamps for the year 1919.	Nicholas J. Hayes, Comr. of Water Sup., Gas & Elect.
Miss.,	Inverness	Jan. 2.	Improving electric light plant, including installation of oil engines, pumps, alternators, etc	N. A. Kramer, Engr., Magnolia, Miss.
Ia.,	Des Moines	3 p.m., Jan. 3.	Conduit and wiring and lighting fixtures in the old U. S. Courthouse	Superv. Archt., Treasury Dept., Washington, D. C.
Minn.,	Hallock	2 p.m., Jan. 7.	Construction of 60,000-gal. steel water tank	Earle D. Jackson, Cons. Engr., St. Paul, Minn.
Tex.,	Houston	noon, Jan. 10.	Furnishing one generator complete with steam turbine condensers and switchboard, to be used at central water plant	E. E. Sands, City Engr.

BRIDGES.

Ky.,	Louisville	1.30 p.m., Dec. 30.	Constructing creosoted wood block floor on bridge over Salt River in Jefferson county	Merritt Drane, Co. Road Engr.
Mass.,	Cambridge	10 a.m., Dec. 30.	Repairs to bridge	Edward J. Dunphy, Supt. of Streets.
Minn.,	Duluth	noon, Dec. 30.	Construction of corrugated culverts for county ditch	O. Halden, Co. Aud.
Neb.,	Omaha	Jan. 2.	Constructing and repairing bridges during year	Geo. E. Johnson, State Engr., Lincoln, Neb.
N. J.,	New Brunswick	2.30 p.m., Jan. 2.	Construction of a Strauss trunnion bascule draw span and concrete encased girder approach spans over the Delaware River	Alvin B. Fox, Co. Engr.
O.,	McConnelsville	10 a.m., Jan. 2.	Construction of bridge over creek	Harry Dunn, Engr., Court House.
Kan.,	Great Bend	Jan. 3.	Building three bridges, involving 347 cu. yds. concrete and 17,357 lbs. reinforcing steel	County Clerk.
Neb.,	Wayne	noon, Jan. 3.	Construction of the following bridges: 40-ft. steel girder, 18-ft. roadway; 40-ft. span, 16-ft. roadway; 24-ft. steel I-beam with 16-ft. roadway; 20-ft. concrete arch bridge, 18-ft. roadway, and 20-ft. concrete slab, 18-ft. roadway	Chas. W. Reynolds, Co. Clk.
Okla.,	Tulsa	2 p.m., Jan. 6.	Construction of culverts and bridges	County Engr.
Ind.,	Vevay	1 p.m., Jan. 6.	Construction of reinforced concrete or iron bridge over Willow Creek	J. D. Froman, Co. Aud.
Miss.,	Vicksburg	noon, Jan. 6.	Repairing bridge	J. D. Laughlin, Chancery Clk.
Miss.,	Macon	Jan. 6.	Constructing six brick arches on two county roads	John A. Tyson, Chancery Clk.
Miss.,	Cleveland	Jan. 6.	Constructing two steel bridges across Sunflower River and one steel bridge across Bogue Phalia	P. B. Woollard, Clk., Bd. of Co. Superv.
D. C.,	Washington	2 p.m., Jan. 7.	Construction of bridges on Concord Avenue	E. D. E. Gargas, Chief Clerk, Room 427, Dist. Bldg.
Wash.,	Waterville	10 a.m., Jan. 7.	Construction of a six-bent frame trestle bridge	County Engr.
Ark.,	Little Rock	noon, Jan. 10.	Construction of reinforced concrete arch bridge over Arkansas River	Lee Miles, County Judge.
Wash.,	Bellevue	10 a.m., Jan. 13.	Construction of a 600-ft. timbered trestle on cedar piles, 18 ft. wide	Sam Humes, Co. Engr.
Neb.,	York	noon, Jan. 14.	Constructing and repairing bridges in York County	Annie H Beck, Clk.

MISCELLANEOUS.

La.,	New Orleans	11 a.m., Dec. 30.	Deepening portion of existing intra-coastal waterway between the Calcasieu and the Sabine rivers	313 Custom House Bldg.
Minn.,	Washington	2 p.m., Dec. 30.	Constructing judicial ditch No. 5, involving 81,464 cu. yds. excavation; 66.29 cu. yds. concrete; 1,850 ft. 12-in. tile; 2 flood water inlets; wire fence, and leveling spoil tanks	County Auditor.
Minn.,	Waseca	2 p.m., Dec. 30.	Construction of judicial ditch, involving 81,464 cu. yds. excavation; 66.29 cu. yds. concrete; 1,850 ft. of 12-in. tile; two flood water inlets; 21,015 ft. of 3-wire fence; leveling spoil banks	Co. Aud.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Ont.,	Alvinston	Dec. 21.	Constructing drain	L. W. Oke, Engr.
N. B.,	Back Bay	noon, Dec. 31.	Renewal and repairs to public wharf	R. C. Desrochers, Secy., Dept. of Public Works.
O.,	Cincinnati	Jan. 1.	Filling Miami and Erie Canal over culvert and constructing necessary drains, catch basins and manholes	Henry A. Nunlist, City Engr., 1112 Traction Bldg., Cincinnati.
N. Y.,	Tompkinsville	Jan. 3.	Furnishing 503,000 gal. of kerosene in cases containing two 5-gal. cans	Supt. of Lighthouses, Tompkinsville.
Minn.,	St. Paul	11 a.m., Jan. 3.	Digging and constructing ditch No. 17 in Ramsey Co.	Geo. J. Ries, Co. Aud.
N. C.,	Terra Ceia	noon, Jan. 3.	Dredging, deepening and widening the canals in Broad Creek drainage dist., involving approximately 66,000 cu. yds. excavation—to be done by a floating dredge; deepening and cleaning about 36 mi. of canals, involving 260,000 cu. yds. excavation to be done by a bank [redacted] machine	R. H. Howell, Secy.
Tenn.,	Brownsville	Jan. 3.	Building canal in three districts, involving 545,220 cu. yds. excavation	Kinney & Wills, Attys.
Tex.,	Galveston	Jan. 6.	Construction of hangars, pavement and beach (Spec. No. 3439)	Bureau of Yards and Docks, Navy Dept., Washington, D. C.
N. Y.,	Albany	noon, Jan. 7.	Improving New York state canals, involving excavating the canal channel in the Genesee River, completing canal from east guard-lock to Genesee River	W. W. Wotherspoon, Supt. of Pub. Wks., Capitol, Albany, N. Y.
Ark.,	Bridge Junction	noon, Jan. 9.	Constructing approximately 600,000 cu. yds. of canal dredge work to drain lakes in Crittenden and Lee Counties	H. N. Pharr, Chief Engr.
Ont.,	Stratford	Jan. 13.	Construction of tile drain	P. Smith, R. R. No. 11, St. Paul's Station, Ont.
N. Y.,	Albany	noon, Jan. 14.	Improving the Cayuga and Seneca Canal, extending the core wall and other work at the north end of dam No. 2; drilling holes in the sill of the dam and the toe of the river wall of the lock near Rotterdam, and making necessary repairs in Erie Canal; furnishing and installing two 3-ton electric semiportal revolving jib cranes on pier 6, East River, N. Y. City	W. W. Wotherspoon, Supt. of Pub. Wks., Capitol, Albany, N. Y.
N. Y.,	Seneca Falls	noon, Jan. 11.	Construction of barge canal section	W. W. Wotherspoon, State Supt. of Pub. Wks., Capitol, Albany.
Ga.,	Carnesville	Jan. 15.	Drainage work	W. R. Little, Secy., Middle River Dist., Franklin Co.
Ky.,	Madisonville	Feb. 3.	Construction of Otter Creek ditch, involving 161,207 cu. yd. excavation, 126.48 acres clearing and 2 bridges, 30 ft. each	Basil M. Brooks, Secy., Drainage Board

ROADS AND STREETS

Bessemer, Ala.—City has appropriated $12,000 for street improvement work next year. R. S. Moon, supt. of public wks.

Birmingham, Ala.—Fairfield Utilities Co. has been incorporated with capital stock of $50,000 and will begin soon the improvement of streets, construction of water works system and street railway and establishment of electric light and power plants. George Gordon Crawford, president of Tennessee Coal, Iron & Railroad Co., is president.

Chico, Cal.—Butte County Road Engineer M. C. Polk announced that work will be started immediately on a stretch of the Humboldt road, from Hog Springs to the Fourteen-Mile House, a distance of three and a half miles. The road will be filled to level with a crushed rock bottom, at a cost of approximately $6,000.

Los Angeles, Cal.—See "Sewerage."

Sacramento, Cal.—State road work mapped out by the advisory board; among these were the El Centro-San Diego lateral and a fifteen-mile section between Tecate Divide and the eastern boundary of San Diego county. Other layouts approved included the following: Mendocino county, 13.8 miles, between Sherwood-Laytonville road, Rattlesnake Summit. Riverside county, 5.55 miles, near Indio. San Bernardino county, 8.67 miles, between San Bernardino and Devore, and 15.17 miles, between Devore and Summit. San Joaquin county, 7.48 miles, between the south boundary of the county and Manteca, and 11.1 miles, between Manteca and Stockton. A Riverside county section will be built by day work, the bid of nearly $36,000 being several thousand dollars above the estimate.

Blountstown, Fla.—Calhoun county has sold to H. B. Gaskin, of Blountstown, road bonds, $70,000. J. R. Peacock, clk. Circuit Court.

Crestview, Fla.—Bids will be asked again for construction of Crestview-Camp Walton road in Okaloosa county, 27.92 miles in length, to include clearing, grubbing, grading and surfacing with sand-clay and construction of wood bridges and culverts. J. T. Bullen, district engr., Bell Bldg., Montgomery, Ala.

Dubuque, Ia.—Business men are interested in the proposed paving of the old Military road, between Dubuque and Cascade, and have started a subscription list in order to finance the improvement, which is expected to cost in the neighborhood of $600,000.

Great Bend, Kan.—Barton county lets contract in January for the construction of federal aid road work in Pawnee Rock, Liberty, Buffalow, Great Bend and Lakin townships, Barton county, known as Santa Fe Trail Road, Federal Aid Project No. 3. This involves a gross length of 161,137.5 ft. and a net length to be improved of 144,395.9 ft., including the construction of a 20 ft. wide monolithic brick road with 5 ft. wide earth shoulders, together with all work involved and indicated by the plans. Webb Beardsley, county clerk.

Leavenworth, Kan.—For 22 miles, Fort to Fort highway, 18 ft. wide, concrete, Leavenworth county had survey made, about $548,963. L. C. Clark, county engr.

Wichita, Kan.—Plans are being prepared for Sedgwick county for building Central Ave. road, about $250,000. M. Roseberry, county engr.

Corbin, Ky.—City lets contract in January for 2,981 sq. ft. of concrete paving. Fred Nevels, city clerk.

St. Paul, Minn.—Charles M. Babcock, commissioner of highways, announced the tentative plans for the proposed state trunk highway system which is to be recommended to the coming session of the legislature for submission to the people at the general election in 1920 for their approval as an amendment to the constitution of the state. The program provides for the creation of a state trunk highway system of approximately 6,000 miles in extent, which is to be constructed, reconstructed, improved and forever maintained by the state of Minnesota. In order that the state may proceed at once to improve the system, the legislature will be authorized to issue bonds of the state to finance the work.

Great Falls, Mont.—Cascade county highway bonds, $100,000, have been sold to the Harris Trust & Savings Bank of Chicago. John E. Moran, county clk.

St. Joseph, Mo.—City plans to pave 3.-300 ft. Gene Field Rd., 30 ft. wide; 1,900 ft. 26th St., 30 ft. wide; 1,500 ft. Main St., 33 ft. wide; 400 ft. Poulin St., 30 ft. wide; 1,700 ft. 26th St., 30 ft. wide; 700 ft. 27th St., 30 ft. wide; 1,300 ft. Duncan St., 30 ft. wide; 6,300 ft. 22nd St., 30 ft. wide; 1,600 ft. Alabama St., 30 ft. wide; 1,600 ft. Valley St., 30 ft. wide; 1,600 ft. 27th St., 30 ft. wide; 1,000 ft. 15th St., 30 ft. wide; 1,900 ft. 12th St., 30 ft. wide; 1,300 ft. Shady Ave., 30 ft. wide; 4,500 ft. Lafayette St., 30 ft. wide; 2,000 ft. 5th St., 33 ft. wide; 1,000 ft. Messanie St., 30 ft. wide; 3,000 ft. 4th St., 36 ft. wide; 650 ft. 8th St., 33 ft. wide; 750 ft. Edmond St., 30 ft. wide; Frederick Ave., 30 ft' wide; 6th St., 36 ft. wide; also 2nd, Francis, Charles and 3rd Sts. H. D. Judson, City Hall, engr.

Ashland, Neb.—Ordinance has passed the council for the issuance of the following bonds: Paving district No. 1, assessment, $17,400; paving district No. 1, intersection, $9,260.

Jersey City, N. J.—For furnishing 300 bbl. Portland cement, 250 bbl. common lime, 100 bbl. finishing lime, 20 bbl. plaster paris, 25 bbl. fine clay, 10 bbl. white sand, 200 yds. screened building sand, 50,000 hard burned brick, 15,000 No. 1 brick, 15,000 ft. white pine, 15,000 ft. 2nd quality white pine, 6,000 ft. spruce timber, 12,000 ft. yellow pine flooring, 3,000 ft. ¼x2½-in. maple flooring, etc. Hudson county receiving bids in January. About $15,000.

Kenmore, N. Y.—H. A. Kahler & Co., of New York, successful bidders for an issue paving bonds, $7,692. E. W. Johnson, village clk.

Rome, N. Y.—Board of public works was granted permission to sell assessment bonds for the paving of Canal St. between James and Depeyster Sts.

Danbury, N. C.—Stokes county will vote Jan. 21 on issuing Peter's Creek township road bonds, $35,000.

Mooresville, N. C.—Street improvement bonds, $12,650, sold to Prudden & Co., of Toledo. James L. Donald, supt.

Bryan, O.—Williams county, Bert Bender, engr., and G. C. Bender, auditor, will probably take bids about Jan. 15 for road improvements to cost $12,500.

Dayton, O.—Engineer F. O. Enhelberger, City Manager G. E. Barlow and Service Director H. P. Martin will take new bids in the spring for paving various streets.

Delta, O.—Authority to construct two roads in the county has been received by the Capital Issues Committee. For the main market road, 5 miles, running west from Main St., Delta, waterbound stone road, and an inter-county road running north from Metamora to the state line, connecting with a Michigan stone road.

East Liverpool, O.—The first plan of the Good Roads Association of Hancock county will be to construct a boulevard between Wierton and Chester, where it will connect with other good roads to down state points. The organization will include citizens from Chester, Newell, New Cumberland, Werton and Holliday's Cove.

Lakewood, O.—The city will expend $1,256,000 on street improvements the coming year. Paving will include Marlowe, $16,350; Morrison, $10,000; Shaw, $12,600; Woodford, $12,700; Rio, $6,000; Andiner, $31,700; Belle, $26,500; Carabel, $36,840; Idlewood, $9,350; Clifton Blvd. from Highland Ave. to Rocky River, $473,000; Madison, $305,600; Detroit Ave. extension, $15,000; Chesterland, $15,000; Olive, grading, $4,000; total, $993,540; sewers, intercepting, river to Webb, $154,000; Olive, Hilliard to Margaret, $17,300; water mains, Berea road, $41,500; Olive, $5,000; street extension, Franklin Ave., $75,000.

Cincinnati, O.—The council has authorized the issuance of bonds in the sum of $420,500 for street and sewer repairs and for the construction of a new municipal asphalt plant. City Engineer Frank S. Krug is preparing the plans.

London, O.—Plans are being drawn for dragging and paving National and Mt. Sterling pikes for the county of Madison, O., Ellen Blacker, auditor, and John Asher, engr., court house, this city, and the State Highway Dept., Columbus. The work will mature in the spring. This county also contemplates grading and paving the various other localities.

Mansfield, O.—Richland county is to secure $52,500 for good roads work from the state highway commission for 1919. The Lincoln highway is to be improved east of here for a distance of three and one-half miles. Federal aid to the amount of $35,000 for the improvement has been authorized.

Martins Ferry, O.—The council will shortly advertise for bids for the repaving of Belmont St. from McMahon Creek to 35th St. The repaving of Union St. from McMahon Creek to Central Ave. The repaving of Central Ave. from Union St. to Hamilton St. The repaving of Guernsey St. from 32d St. to 37th St. The repaving of 37th St. from Belmont St. to Noble St. The repaving of Noble St. from 37th St. to 45th St. The repaving of 44th St. from Noble to Jefferson St. The repaving of Jefferson St. from 44th St. north.

New Carlisle, O.—The commissioners have asked the state highway commission to assist in the paving of the national road through Clark county. County Engineer Sieverling is already preparing plans.

Sabina, O.—Federal money will be secured on the Wilmington and Sabina Pike improvement, which will be undertaken early in the spring. Bridge and culvert plans on this section have been approved. Plans by Howard Collett, county surveyor.

Sandusky, O.—County Engineer Schultz expects to have plans for the Cleveland-Sandusky road and the Sandusky-Lincoln road ready for construction early in the spring.

Springfield, O.—City Manager O. E. Carr is preparing an estimate on the paving of Spring St. from High St. to North St.

Toledo, O.—C. L. Rood, county surveyor, has submitted plans for 1919 road improvement to the county commissioners. An elaborate program is mapped out. The roads to be improved will shortly be announced by the commissioners.

Washington C. H., O.—The construction of the Columbus pike will be undertaken by the county commissioners with state aid early in the spring.

Wooster, O.—The county commissioners are to improve the Lincoln highway west of here and five miles of the Wooster-Creston road early in the spring. The cost will be $125,000 for the Lincoln highway and $98,000 for the Wooster-Creston road.

Zanesville, O.—The road from Main St. in the village of Dresden will be paved in the spring, 2 miles southwest toward the Frozeyburg road.

Zanesville, O.—The county commissioners have voted to improve the remaining six miles of the Maysville pike. Efforts will be made to secure federal aid in the sum of $10,000 a mile and with state and county aid to complete the work this year. This is one of the unimproved sections of the cross state road from Cincinnati to Cleveland.

Tulsa, Okla.—Tulsa county lets contracts in January for constructing the following roads, such roads to be graded and brought to the established grade, preparatory to hard surfacing: Section "Y" of state road, 6 miles long; Section "H," 6 miles; Section "K," 4 miles; Section "L," 3 miles; "N," 4 miles; "D," 7 miles; "A," 2 miles. Lewis Cline, county clerk.

Portland, Ore.—Construction of highways calling for spending of $3,525,200 contemplated in program of commission. Funds will come from the $6,000,000 hard surfacing fund, quarter mill tax fund and automobile tax. The projects to be built and the engineer's estimate of their cost are as follows: Polk county line to Corvallis, pave 7 miles, $129,500; Monroe to Junction, pave 9 miles., $166,500; Jefferson to Albany, pave 9 miles, $166,500; first crossing south of Goshen to second crossing, rock 1 mile, $6,000; Walker to Cottage Grove, pave 4 miles, $74,000; Winchester to Roseburg, pave 5 miles, $92,500; Yoncalla to Oakland, rock 10.4 miles, $72,800; Myrtle Creek to Dillard, rock 12.8 miles, $76,800; Wolk Creek to Grove Creek, rock 5.8 miles, $34,800; Grants Pass to Jackson county line, pave 6 miles, $105,000; Central Point north, pave 5 miles, $92,500; Siskiyou section, $50,000; Marshfield south (14 ft.), pave 12½ miles, $250,000; Multnomah county line to Hillsboro, pave 8.1 miles, $149,850; Newberg to West Dayton, pave 5 miles, $92,500; Tilamook county, pace 5 miles, $92,500; Astoria to Warrenton, pave 5 miles, $92,500; Overhead Comstock, $10,000; Wasco county, pave 5 miles, $92,500; La Grande to Hot Lake, pave 9 miles, $166,500; Haines to Baker, rock 14 miles, $84,000; Hood River to Mosier, rock, $175,000; Divide crossing, rock, $16,000; Wasco county, gravel 14 miles, $84,000; Sherman county, gravel 8 miles, $48,000; Gillam county, gravel 10 miles, $60,000; Morrow county, gravel, 24 miles, $130,000; Umatilla county, gravel 30 miles, $180,000; total, $2,790,200. Following are the projects to be constructed from the quarter mill tax fund, and the automobile fund, together with the estimate of cost: Grading and rock, Grand Ronde, $45,000; grading, Seuferts, $150,000; bridge, Deschutes, $25,000; Sherman county, $100,000; Gillam county, $140,000; John Day, $20,000; Morrow county, $30,000; Hood River-Mosier, $175,000; Klamath towards Bend, $25,000; Lake county, $10,000; Klamath to Jackson county, $25,000; total, $735,000.

Erie, Pa.—The repaving of State St., the paving of 31st St., Reed, Wayne, Perry, East Ave. and Pennsylvania Ave. from 28th St. to 31st St., are all under consideration by the council.

Pittsburgh, Pa.—For grading, paving and curbing Cowan St. from Dilworth St. to Southern Ave., about $14,000, and on Fredonia St. from Lorenz Ave. to city line, cost $12,000; also Dilworth St. from Gray to Cowan St., city receiving bids in the spring. N. S. Sprague, city engr.

Pierre, S. D.—The state highway commission has secured government approval of highway projects in this state to the amount of $429,966.

Montague, Tex.—Halsey, Stuart & Co., of Chicago, purchased Montague county road bonds, $200,000. W. T. Russell, county judge.

Sinton, Tex.—The attorney general has approved an issue of San Patricio county road district No. 4 bonds, $75,000.

Snyder, Tex.—Scurry county, Dec. 7, voted in favor of issuing $200,000 road bonds.

Utah—State road bonds to the amount of $500,000 have been sold to the Palmer Bond & Mortgage Co., of Salt Lake City.

Seattle, Wash.—Board of public works rejected bids received for grading Holyoke Way. New bids will be called for the work to be done in connection with the improvement of Rainier Av., by grading, in local improvement district 3166.

Seattle, Wash.—Plans and specifications were submitted by the city engineer for street improvements costing $150,000.

Wenatchee, Wash.—Chelan county is favoring a road bond issue of $800,000 to build a system of permanent highways. It is claimed that 50 miles of paving 16 ft. in width could be put down for this amount. Fred M. Berry, county engr.

Esquimalt, B. C.—The Federal Government will be requested by the Esquimalt council to pave the Esquimalt road and keep it in repair. Councilor, Mr. Anderson.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Los Angeles, Cal.—*G. R. Curtis, 2440 E. 26th St., at $17,634, for paving 2d and Hope Sts., improvement district asphalt and granite block.

Belleville, Ill.—*John J. Keeley Bros., East St. Louis, for road in Belleville, at $60,000. Board of supervisors. D. O. Thomas, engr., Belleville.

Milleyville, Ill.—*Independent Constr. Co., 304 Lane Bldg., Davenport, Ia., for paving and drainage, $65,000. A. Schnell, engr.

Charlotte, Mich.—*L. Partlow, for building 1⅓ mi. road west of Grand Ledge township, by Eaton county, about $12,000.

New Brunswick, N. J.—*T. H. Riddle, 102 Church St., New Brunswick, for regulating, grading and curbing Sanford St. Asher Atkinson, Room 9, City Hall, engr.

New Brunswick, N. J.—*T. H. Riddle, 102 Church St., New Brunswick, for regulating, grading and curbing. Board of commissioners. Eugene J. McLaughlin, city clerk, City Hall, 78 Bayard St. Asher Atkinson, City Hall, engineer.

Philadelphia, Pa.—Department of public works, bureau of highways, city hall, Philadelphia. Average unit low bids. Letting 12-10-18. Schedule "A," grading, total amount of low bids, $4,040.67: 10,746 cu. yds. grading—Excavation, 1,595; average price of 65c per cu. yd.; fill, 9,151; average price of 32.8c per cu yd. Low bidders: Cunningham & Murray, 1345 Arch St.; John A. McClatchey, Land Title Bldg.; F. Mark Contracting Co., 2820 N. 21st St. Schedule "B," asphalt paving (assessment work), total amount of low bids, $17,265.64; asphalt paving (including 6-in. concrete base), average price of $3.63 per sq. yd.; vitrified block gutter paving (including 6-in. concrete base), average price of $4.83 per sq. yd; low bidder: Union Paving Co., 30th and Locust Sts. Schedule "C," furnishing motor trucks and teams for the year 1919; average unit price per day: District 1, 2½-ton motor trucks, $14.99; double teams, $6.64; single teams, $3.24; district 2, double teams, $5.94; single teams, $4.09; district 3, double teams, $5.83; single teams, $4.09; district 5, double teams, $6.65; single teams, $4.35; district 6, 2½-ton motor trucks, $15.00; double teams, $6.20; single teams, $4.10; district 7, 2½-ton motor trucks, $14.50; double teams, $6.65; single teams, $4.35. Low bidders: H. J. Farrell, 6352 Paschall Ave.; Charles S. Bader, 5953 Cobbs Creek parkway; William Bosher, 628 Christian St.; J. Devlin, Jr., 7553 N. Hancock St.; J. F. Nolen, 64 Church Lane; Root Brothers, Ridge Ave. and Righter St.; F. C. Maguire, 5608 Devon St. George E. Datesman, director. F. C. Dunlap, chief.

Seattle, Wash.—F. N. Badolato (P. O. Box 561, Seattle), $5,377.50; Frank Augustino, $5,715, bidders for concrete walks, Seventeenth Ave. Board public works.

Seattle, Wash.—Stewart Const. Co., 1116 American Bank Bldg., alternate "A," $37,582; alternate "B," $37,678.25. Bidder for filling and paving Holdgate St. Board public works.

Williamson, W. Va.—*Vaughn Constr. Co., Shawsville, Va., for building 8 mi. earth road between Naugatuck township and Wayne county line, about $70,000, by Mingo county.

SEWERAGE AND SANITATION

Globe, Ariz.—City lets contract in January for constructing sanitary sewer and sewage disposal plant, consisting of approximately 18 mi. of sewer lines varying in size from 6 to 18 ins. and in depth from 0 to 12 ft., approximately 280 manholes, 12 drop manholes, 22 flush tanks and 76 lampholes. The sewage disposal plant consists of two reverse flow Imhoff tanks, two sludge beds and chlorinator house with necessary excavation. Benham Engineering Co., consulting engrs., 13th floor, Colcord Bldg., Oklahoma City, Okla.

Morrilton, Ark.—Sealed bids received Dec. 30, sewer improvement district No. 2 bonds, $22,000. V. V. Hellums, secretary board of commissioners.

Los Angeles, Cal.—City defeated the proposition to issue sewer bonds to the amount $135,000 at recent election. Chas. L. Wilde, city clerk.

Los Angeles, Cal.—City Attorney Stephens received notice of the approval by the Capital Issues Committee of the $150,000 of Bairdstown sewer bonds and of the Hope St. improvement district. The latter project includes the paving, guttering, curbing, sidewalking and sewering of Hope St., between Second and Third, the estimated cost of which is about $19,000.

Independence, Kan.—City council passed an ordinance for the construction of an 8-in. lateral sewer on East Magnolia St., between Earl St. and Waldschmidt Ave. south on the line which divides Naut's suburban addition and in block 3, Chaney's addition. G. H. Krienhagen, city clerk.

Ferndale, Mich.—Citizens voted Dec. 14 in favor issuing bonds aggregating $151,000, as follows: Sewer, $37,000; town hall and fire department, $15,000; water system, $99,000.

Cleveland, O.—These bond issues have been approved by the Capital Issues Committee: Sewers, $1,000,000; paving, $1,000,000; hospital improvements and additions, $900,000; property owners' share of paving, $850,000; property owners' share of sewers, $250,000; Carnegie extension, $30,000; garbage service betterments, $30,000; police department, $20,000; fire department, $30,000, and an issue of $480,000 for improvements in public works.

Sandusky, O.—County Engr. Schultz has been authorized to prepare plans for sewer work in Mitiwanga park and Ruggles beach.

Scranton, Pa.—Robert W. Allen, director of public works informed council that the Delaware, Lackawanna and Western Co. is willing to convey deeds to land in the Fifteen and Twenty-second wards for the proposed sanitary sewer system in that section.

Sharon, Pa.—Bond issues are about to be voted as follows: To complete sewer construction, $50,000; for permanent street improvements, $15,000; to fund floating indebtedness, $85,000.

Raleigh, N. C.—See "Water Supply."

Chilton, Wis.—City receiving bids Jan. 7 for the following bonds: Sewer, $18,000; water works, $10,000. A. J. Pfeffer, city clerk.

Edmonton, Alta.—To the plant of the Swift Canadian Co., Ltd., sewer will be installed. A. W. Haddow, Civic Block, engineer.

Ottawa, Ont.—Construction of sewer system here is considered by city council. A pumping unit will also be installed. A. F. Macallum, commissioner of works.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Los Angeles, Cal.—*Adam Dalmatin, for constructing sewer in Hazelwood Ave., between York Blvd. and Campus Rd., in Hazelwood Ave. sewer district, at $3,621, and for sewer in 59th Pl., between Moneta Ave. and Main St., at $1,523.

Los Angeles, Cal.—*John Blach, for constructing sewer in Denison Ave., between 32d and 36th Sts., in Denison Ave. sewer district, at $5,700.

Los Angeles, Cal.—*Joseph D. Zatch, for constructing sewer in Main St., between Florence and Slauson Ave. in the Main St. and Florence Ave. sewer district, at $28,799.

Warsaw, Ill.—*J. J. Jobst, 1098 Jefferson St., Peoria, Ill., for municipal sewer, $30,000.

St. Helena, Md.—*Fisher & Carozza, 803-7 Calvert Bldg., Baltimore, for building sewage pumping station, about $50,000. By Dundaek Company and U. S. Housing Dept. Work consists of erection of pumping station, receiving reservoir, installing 2 pumps, 500,000 and 1,000,000-gal. capacity respectively, provision for 3 other pumps to be installed later, three-quarter-mile wooden-stave force main, 2 wooden septic tanks, one-half-mile outfall sewer leading to deep water in Patapsco River, three 1-sty. buildings, brick and stone, concrete foundations, to house pumps, 2 wooden structures, 1 over receiving reservoir and other over septic tanks.

Boston, Mass.—*Frank Drinkwater, at $5,404.25, for building sewerage works in Archdale Rd. and South St., between Washington and Lesher Sts., West Roxbury. Board public works.

Plainview, L. I., N. Y.—*Barnet Constr. Co., 150 Nassau St., N. Y. City, at $1,293, for drainage basins and drains, etc. Board of supervisors of Nassau county. Tooker & Marsh, architects, 101 Park Ave., N. Y. City.

Mansfield, O.—The *Mansfield Clay Products Co. for furnishing and delivering the material along line of the Trimble ditch at a total cost of $3,470 for 1,000 ft. 15-in. tile, 2,200 ft. of 20-in. tile and 2,206 ft. of 24-in. tile. *George Morrow, $945, for placing 1,000 ft. of 15-in. tile at $80; for placing 2,200 20-in. tile, $354; placing the same number of feet of sewer pipes, 24 inch, $395; concrete head wall, $36, and for opening 17 cu. yds. of ditch excavation, $80.

Sandusky, O.—*M. J. Callan, this city, for laying sewer and 12-in. water line in Sycamore Line, Lane St. and Wayne St., at $20,022.

Miami, Okla.—*F. P. McCormack, building sanitary sewers in Dists. 34, 35 and 36, about $33,355.

North Braddock, Pa.—*Thos. George, at $5,066, for sewers in Grant and Dunba Aves. Borough council. Geo. F. Siefers, borough engineer, Spring and Jones Ave.

Fountain Inn, S. C.—*Garedson Constr. Co., Columbia, for building sewerage and waterworks systems. By city. About $99,000 available.

WATER SUPPLY

Birmingham, Ala.—See "Streets and Roads."

Los Angeles, Cal.—The public service commission has authorized Chief Engineer Mulholland to proceed with the work of acquiring rights of way for the proposed pipeline from Franklin canyon reservoir to the Westgate district, in order that complete estimates of the cost of installation in that territory may be made.

Oildale, Cal.—Citizens voted Dec. 3 in favor of creating a water district and issuing water system bonds, $20,000.

Waterbury, Conn.—City has sold to Kissel, Kinnicutt & Co. and the First National Bank, of New York, jointly, funding water bonds, $400,000. Chas. B. Tomkinson, city clerk.

Baltimore, Md.—The following amounts have been appropriated by water department, to be expended during 1919: $100,000 for 30,000,000-gal. pump at Mt. Royal Pumping Sta., North Ave. and McMechen St.; $7,500 for turbo-generator to be used in motorization of auxiliary units in Mt. Royal Sta., and $26,000 for operating tables in Lake Montebello filtration plant, Rarford Ave. W. F. Lee, engr.

Ferndale, Mich.—See "Sewerage."

Nutley, N. J.—The town commission has had plans prepared for the installation of new lighting units of increased candlepower for the street lighting system. The Public Service Electric Co. supplies energy for operation.

Plattsburg, N. Y.—City has sold to H. A. Kahler & Co., of New York, refunding water bonds, $18,000. W. A. Childs, city clerk.

New York, N. Y.—Only bid received was rejected for furnishing, delivering and laying 12-in. water main across East River from East 140th St. to North Brothers Island and hauling and laying water mains in East 140th St. and North Brothers Island, Bronx Boro., same exceeding appropriation. New bids later. N. J. Hayes, comr. water supply, gas and electricity, Municipal Bldg.

Raleigh, N. C.—A survey is now being made of the city by the health department relative to the necessity of extending the water and sewer systems for sanitary reasons. Recommendations will be made to the city commission.

Beach City, O.—Village Clerk H. B. Ward will take bids Jan. 13, water bonds, $2,200.

New London, O.—Andrew Ledgett, clerk of this village, will sell bonds in the sum of $3,000 for the purchase of boilers, engines and other equipment for the water works department.

Woodsfield, O.—A proposition to issue bonds for $65,000 to purchase the water works plant from The Kinney Co. at Bellaire was lost at a special election here. The franchise of the water company expires in May.

Pilot Rock, Ore.—Council plans election for the purpose of bonding the city to raise funds to repair the water system and take over the light business.

Harrisburg, Pa.—Plans for extensions in the underground conduits for the police and fire alarm system to connect North Court, Briggs and Camden Sts., considered by city.

Pittsburgh, Pa.—Council McArdle presented an ordinance providing for a bond issue of $63,000 to move water pipes in West Carson St.

Chilton, Wis.—See "Sewerage."

Oshkosh, Wis.—An ordinance has been introduced in council which provides for the issuance $50,000 water works bonds.

Meeteetse, Wyo.—Keeler Bros., of Denver, successful bidders for an issue $7,500 water bonds. P. R. Lewis-Zimmerman, town clerk.

Squamish, B. C.—The dept. of public works of Victoria is considering improvements to water works system. A. E. Touman, engr., Victoria.

Regina, Sask.—Wooden water mains, with cast-iron pipe, in various sections of the city, will be repaired by city council.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded).

Bedford City, Va.—*R. L. Robertson, superintendent, reservoir repairs. A. J. Cawthorn, mayor.

Fairhope, Ala.—*Lambert Water Supply Co., Mobile, Ala., to furnish water by driven wells.

St. John, N. B.—*The Bedford Construction Co., East St. John, for water mains, $16,000.

LIGHTING AND POWER

Inverness, Miss.—Bids will be received until Jan. 2 by the city for improving electric light plant; alternators and miscellaneous line materials; specifications may be secured from Xavier A. Kramer, architect and engineer, Magnolia, Miss.

Pompton Lakes, N. J.—B. J. Van Ingen & Co., of New York, successful bidders for an issue electric light and power bonds, $55,000. J. Frank Cornelius, borough clerk.

Bucyrus, O.—The citizens of Sulphur Spring are negotiating with the Central Power Co. for an extension of its traction and power service to that village.

Sidney, O.—Jackson Center is considering a bond issue of $15,000 for an electric lighting plant. The gas company is no longer able to serve the town with lights.

St. Marys, O.—Electric light improvement bonds, $20,000, have been purchased by the state industrial commission. Chas. W. Niles, city auditor.

Pilot Rock, Ore.—See "Water Supply."

Burkburnett, Tex.—The erection of a new steam operated power plant considered by the Central Power & Service Co.

Alvinston, Ont.—Council contemplates the remodeling of electric light plant at a cost of $40,000. F. A. Gaby, Hydro-Electric Commission of Ontario, University Ave., Toronto.

Montreal, Que.—The Shawinigan Water & Power Co., 83 Craig St. West, plans to erect power terminal station to replace the one recently destroyed by fire with a loss of $25,000.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Dallas, Tex.—Contract between the Dallas Power & Light Co. and the Texas Power & Light Co. has been approved by city commissions, for electric current to be furnished users at Monroe Station, or Trinity Heights, as it is called.

London, Ont.—*A. E. Ponsford, 605 Talbot St., St. Thomas, Ont., building power house for the department of public works, Ottawa, at $208,000.

FIRE

Ferndale, Mich.—See "Sewerage."

Nyack, N. Y.—Village sold to the Nyack National Bank fire apparatus certificates, $7,250. Wm. P. Bugbee, clerk.

Philipsburg, Pa.—Borough council has passed an ordinance for the issuance of $10,500 fire engine bonds.

Youngstown, O.—The extension of the two fire limits and the enlargement of two fire districts is planned by Safety Director Kuhns.

BRIDGES

Vero, Fla.—Project for construction of bridge over Indian River has been organized and incorporated previously for the purpose. Vero Beach Co. and East View Co., owners of tracts, are interested.

LaFayette, Ga.—Walker county commissioners, John L. Rowland, clerk, have plans by Cushman-Farleigh Engineering Co., Chattanooga, Tenn., for bridge across Cane Creek, reinforced concrete; two spans, each 25 ft. in clear; one pier and abutment, with 12-ft. roadway.

Quitman, Ga.—Board of commissioners of Brooks county will construct concrete bridges, and will purchase about 60 tons of deformed steel reinforcing bars. J. H. Malloy, chairman.

Lima, O.—The county engineer has been instructed to make the construction of a bridge over the Ottawa river on Malcott St. The cost of the structure will be about $25,000.

Pittsburgh, Pa.—The council finance committee is shortly to arrange for the rebuilding of the 16th and 43d St. bridges over the Ohio river.

Waterville, Wash.—Douglas county lets contract in January for the construction of a six-bent frame trestle bridge near Moses Coulee. Plans prepared by County Engineer R. L. Richards.

Victoria, B. C.—The construction of bridge is contemplated by the city council. W. J. Dowler, clerk.

Portage la Prairie, Man.—The construction of three bridges is contemplated by the Rural municipal council. D. McGowan, clerk.

MISCELLANEOUS

Washington, D. C. (Bureau of Foreign and Domestic Commerce, Department of Commerce)—Agencies are desired from American firms by a man in France for the sale of machinery of all kinds, motor cars, machine tools, ventilating and drying machines, and steel and steel products. Correspondence may be in English. References. Refer to Opportunity No. 27815.

Washington, D. C. (Bureau of Foreign and Domestic Commerce, Department of Commerce)—A representative of a French syndicate, who is at present in this country, desires to purchase and secure an agency for electrical apparatus and supplies, gas fixtures, sanitary apparatus. Correspondence may be in English. References. Refer to Opportunity No. 27817.

Washington, D. C. (Bureau of Foreign and Domestic Commerce, Department of Commerce)—A man in France wishes to secure an agency for the sale of tools operated by machinery, such as air drills, steam riveters, etc., for the metallurgical industry and ship construction. Correspondence should be in French. References. Refer to Opportunity No. 27823.

Lawrence, Ill.—All bids were rejected Dec. 4 for enlarging the Ambraw Levee, involving 54,505 cu. yds. of excavation. R. J. Benefiel, engr.

Beverly, Mass.—City has sold to E. M. Hamlin & Co., of Boston, 3½ months' loan, $100,000. Percy A. Wallis, city treasurer.

Worcester, Mass.—The Park Trust Co., of Worcester, was the successful bidder for the 3 2-3 months' loan, $250,000.

Ferndale, Mich.—See "Sewerage."

Detroit, Mich.—The National City Co., of New York, was the successful bidder for the general improvement bonds, $350,000. George Engle, city comptroller.

Elk River, Minn.—Sherburne county has sold to Kalman, Matteson & Wood of St. Paul an issue of Ditch No. 25 bonds, $7,500. Arthur Robinson, county auditor.

Belzoni, Miss. — Humphreys county commissioners are receiving bids for erecting jail.

Big Timber, Mont.—Benwell, Phillips, Este & Co., of Denver, successful bidder refunding water bonds, $40,000. J. E. Rees, city clerk.

Jersey City, N. J.—Sealed bids received Jan. 3 for the following bonds, aggregating $3,985,000: General imp., $2,382,000; school, $1,559,000; school, $44,000. James F. Gannon, director of revenue and finance.

Bronxville, N. Y.—Sealed proposals will be received by William F. Thompson, village clerk, Jan. 6, for the purchase of $65,000 park bonds.

Brooklyn, N. Y.—The Twenty-eighth Ward Taxpayers Association of Brooklyn are urging the board of estimate to build municipal garbage disposal plants in the borough of Manhattan, Brooklyn and the Bronx. The proposition was referred to Street Cleaning Commissioner MacStay.

New Rochelle, N. Y.—Geo. B. Gibbons & Co., of New York, successful bidders for the following bonds, aggregating $76,137.50: School, $64,500; municipal improvement, $11,637.50. Harry A. Archibald, city comptroller.

Canton, O.—Establishment of a central station for the collection of garbage, purchase of three additional trucks and the establishment of two additional offices, were recommended in a report filed with the city council by Service Director DeCorps as a means of increasing the efficiency of the department.

Cincinnati, O.—Service Director Hornberger and Safety Director Holmes have concluded that a municipality owned and operated waste disposal plant is an absolute necessity, because of the refusal of private companies to bid for the contract for the collection and reduction of garbage. Employment of an expert sanitary engineer to make an investigation and to supervise the construction of the plant has been recommended by Service Director Hornberger. The estimate of the cost of a new plant is $750,000, which Mayor Galvin says must be raised by a bond issue.

Cincinnati, O.—Service Director Hamberger states that the city will erect a garbage disposal plant. Preliminary steps are to be taken at once to bring the matter before council. Estimates made by Director Hornberger indicate it will cost $750,000 to prepare for the collection and disposal of garbage as a municipal undertaking, and he will ask council for authority to employ an expert sanitary engineer to take charge.

Toledo, O.—The city will issue bonds in the sum of $500,000 to pay a portion of the cost of erecting an immense memorial building for the soldier dead. The city is to have complete charge of the selection of plans, of letting the contracts for the building, of its care and maintenance after its completion. Chas. D. Hoover is chairman of the council committee. All civic bodies will co-operate with the city in the enterprise.

Portland, Ore.—Another block of $500,000 of the $1,500,000 bond issue authorized by the voters last May to provide a fund for the purchase of property on which installments and interest on public improvement assessments are delinquent, will be sold by the council. The city attorney was directed to secure permission from the Capital Issues Committee and to advertise the bonds.

Toppenish, Wash.—The approval of the Department of the Interior has been received by the Indian service for expenditures for irrigation and drainage on the reservation during the coming year amounting to $718,000. The department is at present spending the $500,000 appropriation allowed last year by congress. The new appropriations are divided as follows: Wapato project, $500,000; Top-Simcoe project, $100,000; water payment (storage), $100,000; maintenance irrigation, $15,000; superintendent Yakima agency, $3,000.

Kelowna, B. C.—Plans are being prepared by C. T. McNabb, Revelstoke, for contemplated extension of railway costing $25,000 for the C. P. Ry.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Birmingham, Ala.—See "Streets and Roads."

Denver, Colo.—*R. Hardesty Mfg. Co., this city, for furnishing steel check gates and single drum gate hoist for Sun River project, Montana.

Glenwood, Minn.—*Cale & Quigley, Morris, Minn., for constructing county ditch No. 19, involving 4,074 cu. yds. of excavation and laying 200 ft. 6-in. tile, 1,000 ft. of 8-in. and 1,650 ft. 10-in. tile at $2,447.

Brooklyn, N. Y.—Bids were opened by Borough President Riegelmann for furnishing various supplies for the highway department of the Borough of Brooklyn. Following were the lowest bidders: For one steam asphalt roller—*Good Roads Machinery Co. For 6 backdumping trucks—Shadbolt Manufacturing Co. For 2 tar melting and gravel heating trucks—*Charles H. Vass & Co. For one educator for bureau of sewers, *Otterson Auto Educator Co.

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"Equipment Bargains"

and the Result Will Speak for Itself

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
			STREETS AND ROADS.	
N. Y.,	S. I., St. George	noon, Dec. 31	Furnishing one bituminous distributor	Calvin D. Van Name, Pres., Borough of Richmond.
Ind.,	Paoli	2 p.m., Jan. 6	Construction of road in Paoli Twp.	P. M. Stephenson, Co. Aud.
Ind.,	Rensselaer	2 p.m., Jan. 6	Construction of a gravel road in Union Twp.	Joseph P. Hammond, Co. Aud.
Ind.,	Delphi	1.30 p.m., Jan. 7	Construction of a gravel road in Democrat Twp.	H. D. Good, Co. Aud.
			WATER SUPPLY.	
Ill.,	Galesburg	5 p.m., Jan. 2	Construction of a deep well pumping outfit	F. M. Connolly, City Mgr.
			LIGHTING AND POWER.	
O.,	Columbus	noon, Jan. 7	Furnishing and installing covering for the new steam piping at the municipal light plant	Geo. A. Borden, Dir. of Public Service.
			FIRE EQUIPMENT.	
O.,	Urbana	Jan. 7	Furnishing motor fire equipment	City Council.
			BRIDGES.	
N. J.,	N. Brunswick	2.30 p.m., Jan. 2	Construction of Strauss trunnion bascule draw span and concrete-encased girder approach spans over Delaware and Raritan Canal	Alvin B. Fox, Co. Engr.
O.,	Easton	Jan. 4	Construction of steel truss bridge in Dixon Twp.	Albert Campbell, Co. Aud.
			MISCELLANEOUS.	
N. Y.,	New York	2 p.m., Jan. 3	Removing ashes by scows during the year 1919	John H. Delaney, Comr. of Plant & Structures.
O.,	Columbus	noon, Jan. 6	Furnishing 30,000 gal. gasoline for the municipal garage.	L. J. Guthke, Secy., Board of Purchase.
Minn.,	St. Paul	11 a.m., Jan. 8	Digging and constructing ditch No. 17 in Ramsey county.	Geo. J. Ries, Co. Aud.
Minn.,	Duluth	Jan. 15	Collection and disposal of garbage	B. Silberstein, Comr. of Safety.

STREETS AND ROADS.

Columbus, Ind.—Bids received Dec. 31, 1918, at 2 p. m., by treasurer of Bartholomew county, for sale $4,760 and $4,760 highway improvement bonds, 4½ per cent., 10 years. Ed Suvekrup, treasurer.

Pekin, Ill.—Tazewell county drawing plans road. Will take bids about Feb. 1.

Annapolis, Md.—Comrs. Anne Arundel county contemplates roads in various districts, $80,000. Will take bids in spring. E. F. Hayman, Engr.

Ocean City, N. J.—M. Morris, city clerk, receiving bids after Jan. 1 for paving streets. Wm. H. Collison, Jr., engr., City Hall.

Salem, Ore.—In that part of Oregon lying south of Marion, Polk and Lincoln counties, between the Cascade mountains and the coast, and including Klamath and Lake counties, the state highway commission contemplates the expenditure of a total of $1,421,750 in road making during 1919. The program for that section as outlined and estimated by J. C. McLeod, division engineer of the department, is given below: Polk county line to Corvallis, 7 miles pavement, $129,500; Monroe to Junction City, 9 miles pavement, $165,500; Jefferson to Albany, 9 miles pavement, $166,500; first railroad crossing south of Goshen to second crossing, 1.1 mile rock, $6,000; Walker to Cottage Grove, 4 miles pavement, $74,000; Winchester to Roseburg, 5 miles pavement, $92,500; Yoncalla to Oakland, 10.4 miles rock, $72,800; Myrtle Creek to Dillard, 12.8 miles, $76,800; Wolf Creek to Grave Creek, 5.8 miles rock, $34,800; Grants Pass to Jackson county line, 6 miles pavement, $105,000; Central Point north, 5 miles pavement, $92,500; Siskiyou section, $50,000; Marshfield southward, 12.5 miles pavement, $250,000; overhead crossing at Divide, Lane county, $5,850; Divide to Lane-Douglas line, 1 mile rock, $16,000; overhead crossing to Comstock, $10,000; Comstock to Comstock-Leona, macadam, 1.3 rock or macadam, $13,000. Coming also in the program are the following grading projects to be done from the one-fourth mill and auto license fund: Klamath Falls toward Bend, $25,000; Lake county, $10,000; Klamath to Jackson county, $25,000.

Columbia, S. C.—A plant for the issuance of $25,000,000 of highway bonds by the state of South Carolina for building roads connecting every county in the vention held here and will be presented to the general assembly by the South Carolina Automobile Association. The plan was presented by R. Goodwyn of the Chamber of Commerce of the United States.

Seattle, Wash.—Plans and specifications presented for paving Harbor Ave., approximate cost, $85,000. Earthwork, 20,000 cu. yds.; concrete paving, 17,000 sq. yds.; armored concrete curbs, 27,000 ft.; concrete walks, 5,500 sq. yds.

Spokane, Wash.—Public improvements, postponed at the request of the government, are to be revived immediately. The paving of Trent Ave., Olive and Terry Aves., et al.

Madison, Wis.—Highway commissioners considering drainage, grading, culverting and paving various counties.

River Falls, Wis.—City plans paving. Engineer, L. P. Wolff, Guardian Life Bldg., St. Paul, Minn.

Waukesha, Wis.—City considering paving, curb and gutter. Wm. Powrie, City Hall.

Halifax, N. S.—See "Sewerage."

Sandwich East Township, Ont.—Two miles of concrete pavement are contemplated for Detroit River road.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Youngstown, O.—*J. D. Paxon, to build 3½ miles of concrete road in Goshen and Smith townships to close the gap in the Youngstown-Sebring highway, $64,365.89. The Mahoning county comrs.

SEWERAGE.

Davenport, Ia.—City council rejected bids for sewers. J. W. Crowley, chairman pub. wks.

state was formulated at a highway con-

Keewatin, Minn.—Planning sewage disposal plant. John Wilson, civil engr., 300 First National Bank Bldg., Duluth.

Malta, Mont.—City council will hear objections against construction special sewer improvement district No. 12, Jan. 14. J. B. Pierce, city clk.

Astoria, Ore.—Plans for the construction of a complete sewer system in Taylor's Addition were approved by the city council.

Seattle, Wash.—Plans and specifications presented for sewers in 44th Ave., 6,180 ft. 8-in. sewer pipe, 2,400 ft. 10-in. sewer pipe, 3,160 ft. 12-in. sewer pipe, 640 ft. 8-in. wood stave pipe, 880 ft. 10-in. wood stave pipe, 3,160 ft. 12-in. wood stave pipe, etc. Approximate cost, $54,000.

West Bend, Wis.—Storm sewer in Wisconsin St., also across Island Ave., will be installed, and tile along wall on Island Ave.; also catch-basin.

Halifax, N. S.—The following bonds, aggregating $133,500, were purchased by the Eastern Securities Co., of Halifax: N. W. arm sewer, $70,000; local sewer, $26,000; sidewalk, $15,000; water extension, $12,500; abattoir, $10,000.

WATER SUPPLY.

Hillsboro, Tex.—City voted at election $40,000 bond issue for the purpose of drilling an artesian well, approximately 2,600 ft., to Trinity sands; bids will be asked for bonds and for drilling well. W. T. Renfro, superintendent.

Seattle, Wash.—Plans and specifications presented, water mains, Ninth Ave. N. E., 1,180 ft. 8-in. cast iron pipe, two 8-in. gates, etc. Approximate cost, $4,800.

Halifax, N. S.—See "Sewerage."

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Wauwatosa, Wis.—Herman Hohensee, Ludington Ave., Wauwatosa, low bidder for concrete water pipe tunnel. Commissioner, board of public works.

LIGHTING AND POWER.

Casa Grande, Ariz.—Plans are being made for the establishment of an electric power plant here.

Seattle, Wash.—Plans have been completed by company engineers of the Puget Sound Traction, Light & Power Co., covering the construction of a one-story concrete structure, 30x10 feet in size, to be built at the Jefferson St. sub-station at Seventh Ave. and Jefferson St. The building will house lightning arresters.

FIRE EQUIPMENT.

Ashland, O.—City council will readvertise for bids, fire truck. Mayor Covis.

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WYANDOTTE, MICH.

Sealed proposals for constructing a rapid sand filtration plant, addition to existing pumping station and miscellaneous work, addressed to the City Clerk of Wyandotte, and endorsed "Proposals for Rapid Sand Filtration Plant," will be received at the City Hall, Wyandotte, Mich., until 8:00 P. M., eastern standard time, on December 30, 1918, and will be publicly opened and read at that time.

Each proposal shall be accompanied by a certified check for five thousand dollars ($5,000), drawn payable to the City Treasurer of Wyandotte as security for the acceptance of the contract.

The City of Wyandotte reserves the right to accept any bid, reject any or all bids, or waive any informalities in favor of the city, should it deem it to be to the best interests of the city to do so.

Plans, specifications and forms of proposals and contracts may be obtained at the office of the City Clerk, Wyandotte, Mich., or at the office of R. Winthrop Pratt, Consulting Engineer, Hippodrome Building, Cleveland, O.

A deposit of ten dollars ($10) will be required, which deposit will be returned after bids are opened, if the plans and specifications are returned in good condition.

CITY OF WYANDOTTE,
WALTER C. LAMBERT, M.D., Mayor.
EDWARD C. BRYAN, City Clerk.

Bids received until December 30, 1918.

Furnishing and Laying 24" Pipe

WYANDOTTE, MICH.

Sealed proposals for furnishing and laying a 24-inch submerged intake pipe for the City of Wyandotte, Michigan, addressed to the City of Wyandotte, Mich., and endorsed "Proposal for Submerged Intake Pipe," will be received at the City Hall, Wyandotte, Mich., until 8:00 P. M., eastern standard time, on December 30, 1918, and will be publicly opened and read at that time. Each proposal shall be accompanied by a certified check for three thousand dollars ($3,000), drawn payable to the City Treasurer of the City of Wyandotte, as security for the acceptance of the contract.

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Plans, specifications and forms of proposal and contract may be obtained at the office of the City Clerk, Wyandotte, Mich., and at the office of R. Winthrop Pratt, Consulting Engineer, Hippodrome Building, Cleveland, O.

THE CITY OF WYANDOTTE,
WALTER C. LAMBERT, M.D., Mayor.
EDWARD C. BRYAN, City Clerk.

TREASURY DEPARTMENT, Supervising Architect's Office, Washington, D. C., December 23, 1918.—SEALED PROPOSALS will be opened in this office at 3:00 P. M., January 13, 1919, for alterations to the United States Post Office and Custom House at Petersburg, Va. Drawings and specifications may be obtained from the Custodian or at this office at the discretion of the Supervising Architect. JAS. A. WETMORE, Acting Supervising Architect.

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See Page 32

Lima, O.—Supplementing plans for extensive improvements is the plan for the erection of a third fire house on Madison Ave., the cost of which has not yet been figured.

Wapokeneta, O.—The state fire marshal has recommended to the council the installation here of a better fire-fighting equipment.

Zanesville, O.—An initiative petition looking toward the issuing of bonds for the purpose of securing a combination fire truck for the Hamline Ave. fire station, closed by council several months ago, is now in circulation and will be presented soon. Bonds to the amount of $2,500 are provided for in the petition.

Seattle, Wash.—Council passed ordinance appropriating $8,500 and authorizing the board of public works to purchase fire hose.

BRIDGES.

Galesburg, Ill.—Knox county highway commissioners will take bids about March 1, bridge over Spoon river. A. L. Rickey, engineer.

Colfax, Ia.—Engineer, March Engr. Co., Masonic Temple, Des Moines, drawing plans bridge, Jasper county.

Lapeer, Mich.—A. H. McKillop, drain commissioner, taking bids for Plum drain and bridges, to cost $17,000.

Auburn, Wash.—County Engineer Samuel Humes has begun the preparation of plans covering the construction of what will be known as the Lee Hill bridge, that will cross the Green river at Auburn. A 150-ft. steel span will rest on concrete piers and will be reached by heavy timbered approaches; it is likely that bids will be asked on this structure early next year.

Toppenish, Wash. — The Commercial Club is bending every effort to secure a bridge over the Yakima river at a point due east of town. A committee has been appointed to work out plans and estimates of cost.

Ottawa, Ont.—In the early part of the year the department of public works will start work on erection of steel bridge.

MISCELLANEOUS.

Washington, D. C.—An appropriation of $3,000,000 for the Government purchase and deeping of the Chesapeake and Delaware canal was approved by the House Rivers and Harbors Committee in framing its 1920 appropriation bill. For widening and deepening the Livingston channel of the Detroit river, through which passes Great Lakes traffic, the committee voted an appropriation of $750,000.

Carnesville, Ga.—Board commissioners of Middle River drainage district lets contract middle of January for drainage work; a little more than 1,000,000 yds. W. R. Little, secretary.

Sandusky, O.—The construction of the Columbus Ave. subway will probably be undertaken during the coming year.

Port of Astoria, Ore.—P. W. Chapman & Co., successful bidders for an issue $250,000 improvement bonds. R. R. Bartlett, secretary, Port Commission.

Hartford, Wis.—$5,000 for machinery and repairs appropriated by Washington county.

Oshkosh, Wis.—County will spend $6,000 for machinery, mostly graders.

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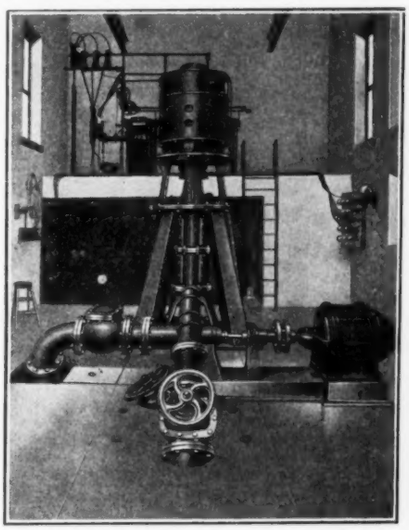

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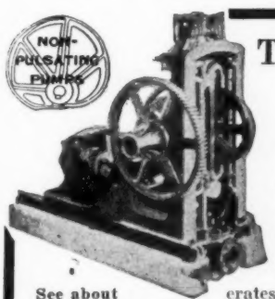

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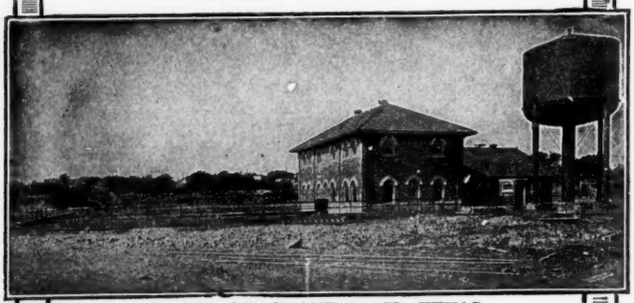

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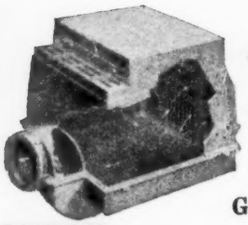

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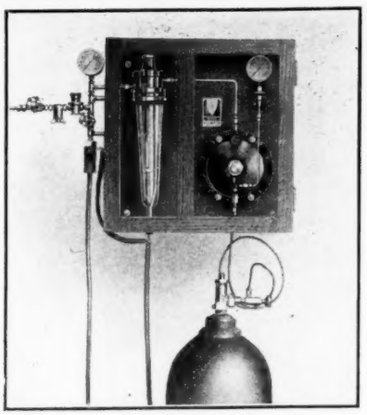

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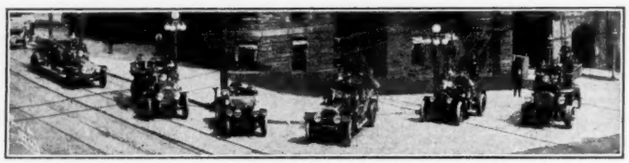

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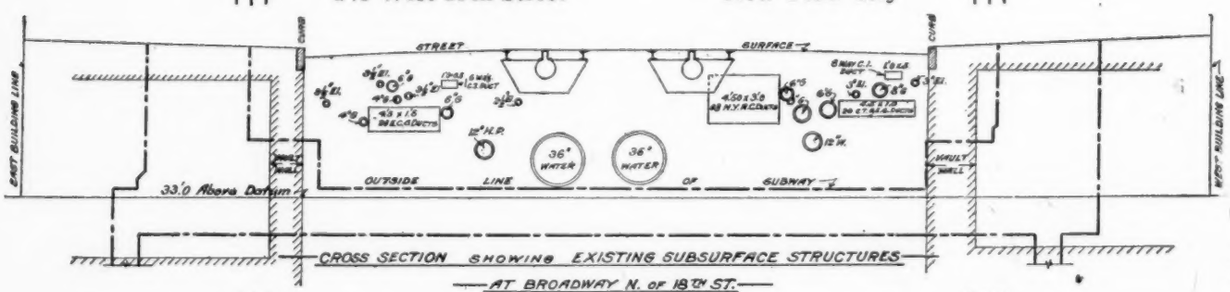

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